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The Ninth Green, Hollywood Golf Club, Deal, N. J.
Where the Women's National Championship was held last year. Stumpf & Walter Co.'s Grass Seed and Fertilizers have been used exclusively, and their advice followed, for the past six years

GOLF TURF

of Fine Quality

HOW TO MAKE IT AND HOW TO MAINTAIN IT

Stumpf & Walter Co.

30 and 32 Barclay Street

New York City

10,000 Miles for Grass Seeds



N the spring of 1921 the varieties of Grass Seeds used for golf-courses were in such short supply that many clubs, late in placing their orders, found it impossible to procure certain imported sorts, chief among them being genuine Creeping Bent, Colonial Bent, Fine-leaved Fescue, Various-leaved Fescue, and Red Fescue.

Reports reaching us from the collecting centers in Europe indicated that a condition of similar scarcity was again likely to rule in the spring of 1922. In consequence, Mr. Stumpp of the Stumpp & Walter Co., decided personally to visit the collecting points for the purpose of obtaining definite information regarding his previously arranged-for crops, to encourage as far as possible additional efforts to collect the maximum quantities this year, and to negotiate on the ground for additional supplies. He left for Europe in September.

It was definitely ascertained that *all the finer European grasses will be in short supply*, and there will probably be a keener shortage this coming spring than last. Owing to the dry season, the crop estimate is about one-third that of last year.

As a result of meeting personally the most reliable collectors, Mr. Stumpp was fortunate in being able to secure a major part of the new crop of these rare grasses. A supply from England, Ireland, Germany, Holland, and France is thus assured the patrons of the Stumpp & Walter Co. In spite of a one-third general supply, the Stumpp & Walter Co. will have available about 75 per cent of last year's total.

Mr. Stumpp returned to America in November. Owing to the extreme scarcity of the finer grades of these choice grasses, his advice to clubs and other users is to *make arrangements early for New-Crop Seeds*. On the following pages will be found prices and other information regarding individual grasses and our Special Bent Formula, Putting-Green Mixture, and Fairway Formula Seeds.

FOREWORD

To the Green Committee

“Golf Turf” is offered in response to many requests on the part of customers who ask for a book giving briefly and in simple language the fundamentals of greenkeeping. We hope it may assist in the solution of your problems. To produce and to maintain fine turf is a wide subject which cannot adequately be put into book form; it is skilled work, requiring the attention of a practical greenkeeper who has had years of experience. We do not claim that this effort on our part will enable you to dispense with the services of a greenkeeper; on the contrary, it is felt that we may bring you into closer touch with the problems that your greenkeeper encounters, and—it may be—enable you the more readily to appreciate his difficulties and his efforts when he produces for you a golfing turf.

To the Greenkeeper

It is our hope that the following remarks may be of interest. Our aim has been to put into words, for the benefit of your club members, your side of the story; we cannot claim that “Golf Turf” will instruct you or give you information which you have already absorbed through the years and in the hard school of experience. It may be, however, that the notes which you will find tabulated here and there throughout the book may sometimes assist you, and may induce you to keep the book for ready reference.

Stumpf & Walter Co.

A Modern Golf Course



THE game of golf requires the utmost perfection in turf. The appearance of a well-kept and well-established course, such as gladdens the heart of a golfer, is living testimony to the unremitting care and hard work of the greenkeeper. A turf can only be brought into a state approaching perfection, and maintained there, by adhering closely to the well-considered plans of a skilful architect; making suitable the soil; sowing pure grass seeds in the proper varieties and of the utmost purity; cutting the grass just at the right time; rolling it only when the soil is fit; top-dressing from time to time to replace plant-foods which are continually being taken up from the soil by the plants and ever seeping away from the soil in the drainage water; detecting at the earliest moment the presence of animal and fungous attacks; and taking the necessary steps promptly to eradicate weeds as they appear. All this means that the greenkeeper has to be on his toes early and late seven days a week. It means, also, that he is entitled to liberal help from his green committee, which in turn should have the fullest confidence and support from the members of the club.

The Building of a New Course

Frequently the golf architect's work is completed when he has delivered his plans and blue prints and has staked out the greens and tees. Very often it is up to the committee to engage a contractor to carry out the architect's plans. Hence, it is of interest to consider a golf course from the beginning, taking the period when the architect leaves and when the contractor arrives, to commence our story.

The contractor will be provided with the necessary teams or tractors, scoops, plows, scrapers, harrows, etc. Also it will probably be necessary for him to have men and materials for dynamiting stumps and rocks. The most satisfactory results in course construction are obtained when the architect superintends personally the construction work, or employs a competent constructor to represent him. Failing this, the contractor must be provided with very minute plans, drawn strictly to scale, and showing clearly all grading work, the location, shape, height, and contours of the greens, with the accurate location of the traps.

The most important point in all construction work is to *conserve all the top-soil*—do not permit grading or plowing to bury this most important material. The first thing after the fairways are located is, assuming that the time will permit, to sow a cover-crop: field peas if in early spring, cowpeas or soybeans in summer; rye and vetch if in the fall and to stand through the winter. The seeds for the cover-crop having been sown, the land harrowed and rolled, the fairways may be left while attention is given to the greens.

The top-soil should be removed from these and the greens built in accordance with the ideas of the designer. It is usual to use subsoil or "fill" for constructing the foundation of the greens, but we have observed the best results where the rough has been skinned for top-soil and this top-soil used in the building of the green to a depth of several feet where necessary. Then, the original top-soil may be spread evenly over the green, and on this about five tons of mushroom soil, humus or rotted manure should be spread and thoroughly forked into the top four inches. About 150 pounds per green of a good chemical fertilizer, such as Stumpf & Walter Co.'s Emerald Grass Fertilizer, may be dusted upon the surface, and the soil then thoroughly raked to bring it into that fine condition necessary for a suitable seed-bed.

Many constructors at this point remove the top inch, inch and a half, or two inches of soil and pass it through a quarter-inch screen, then returning the screened soil to the surface of the green. This is quite costly, but is actually profitable because it tends to produce finer turf more quickly. In any case, care must be exercised to remove all sticks, stones, and other debris. It is a great advantage if, at this point, it is possible to "fallow" the finally prepared green to give weed seeds an opportunity to germinate. As they appear, the soil should be raked to destroy them; and this process may be continued up to the time it is necessary to sow seeds.

The soil being prepared, and made as weed-free as possible the next thing is to select suitable seed and to sow it. For an average-size green, say 25 yards by 20 yards, on medium to heavy soil it is usual to sow from 30 to 60 pounds of pure "Mixed Bents" (Creeping Bent); on lighter land it is usual to sow 100 pounds or more per green of pure Chewing's Red Fescue of strong vitality, increased further if the seeding

is scheduled for the fall; at that time the new crop seed of Chewing's Fescue, showing a high germination, is usually available. Rather than seeding with only one variety, we prefer the use of mixed seeds, and on average-sized greens on medium to heavy land we recommend 75 to 100 pounds of our Special Putting-Green Bent Formula, and on lighter land the same quantity of Standard Putting-Green Mixture. An established green from a mixture of varieties gives a good turf quickly, one that is more uniform through the year and is less likely to suffer badly from extremes of climate or from attacks of fungous disease. The use of mixtures as against separate varieties has the practical support of many years' experience.

With present values, to sow a putting-green with straight "Mixed Bents" (Creeping Bent) costs for seed about \$100; with straight Red Fescue, about \$90; with our Special Putting-Green Bent Formula about \$75; and with our Standard Putting-Green Mixture, about \$60; so the club's appropriation may have some bearing upon the question.

It is best to sow putting-greens by hand, selecting a day when there is little wind and when the soil is dry. The sower should bend his back well, and he should be a man selected for his careful methods and interest in the job. After scattering the seed, a very light raking to place it just under the surface is necessary, and a rolling with a light roller completes the work. Better omit raking, and roll only, if there is any possibility of burying the seed.

By this time the fairways will be ready for attention. The growing cover-crop will be plowed under, so adjusting the plow that the land is thoroughly inverted and the plants covered, but taking care that, with this borne in mind, the plowing is as shallow as possible. It will frequently be found that one or more lengths of heavy chain attached to the rear of the plow will assist in turning the green plants under. If there is any doubt as to the ability of the soil to carry a turf—the growth of the cover-crop is a very good indication of this, varying degrees of fertility in the soil showing in the luxuriant growth or otherwise of the cover-crop plants—rotted manure or mushroom soil should be spread over the plowed land at the rate of twenty tons per acre. A disc may then be run over the land, but with the plates so adjusted that they cut down into the soil but do not invert it. The disc will then be followed by a smoothing-harrow, run across the necessary number of times to bring the land into fine "tilth." Prior to the last harrowing, 750 pounds per acre of Fairway Fertilizer may be applied.

Fairway seed is best sown by means of a wheelbarrow seeder, and a suitable one is listed on page 32. This should be followed by a bush-harrow, an easily made arrangement of branches and twigs held together with light lumber—two or three pieces of 2- by 4-inch boards would be suitable, but arranged so that the lumber does not come into contact with the soil. A medium-weight horse roller drawn over the land completes the seeding. We advise using 200 pounds of seed per acre.

The seeding of tees is carried out on the same general principles as seeding greens, except that a coarser, harder-wearing type of grass is sown. To take care of this we offer a Special Mixture of Grass Seeds for Tees. Allow one pound to each 200 square feet.

The After-Care of Newly Seeded Areas

When young grass is an inch high it is a good plan to encourage it by dusting over it lightly some Stumpp & Walter Co.'s Fertilizing Meal. The effect of this is to stimulate the young plants at just the period when they benefit most. Use the material at the rate of 200 pounds per average size green, or on larger areas at the rate of 2,000 pounds per acre.

It is a mistake to delay cutting young grass. Just as soon as it is an inch and a half long, a well-adjusted, well-oiled,

and thoroughly sharp lawn mower should be run over it. The machine should be so adjusted that at first it no more than "tops" the grass; in two or three days it should be cut again, but with the machine adjusted a shade lower, and in this manner the grass should gradually be brought down to the required height.

Young grass is greatly benefited by frequent rollings with light rollers, taking care always that it is rolled only when the land is in a dry condition.

The Renovation of Putting-Greens

The usual procedure in the case of a green that has not carried well over the winter, or one that is worn after a season's hard wear, is as follows:

- (1) Cut the grass as closely as your machines will cut it.
- (2) Rake the green thoroughly in several directions. This opens up the soil, aerates it, tears out a good deal of the clover and other weeds, and generally cleans the turf. Iron rakes are used, and preferably those the teeth of which have been specially sharpened. The ultimate success of the work depends very largely upon the thoroughness with which this raking is undertaken, and it may be understood that—within reason—the worse the green looks after this raking the better it will eventually be.
- (3) Apply two cubic yards of screened compost to a green

25 yards by 20 yards, mixed with 100 pounds of a good chemical dressing, such as Stumpp & Walter Co.'s Emerald Grass Fertilizer. This is assuming that the club is in possession of a compost heap, as suggested on page 21. If compost is not available, use the above quantity of sharp sand or of screened top-soil obtained from a source that is known to be comparatively free of weed seeds. The Emerald Grass Fertilizer should be mixed with the sand or top-soil.

- (4) Rub this mixture into the turf with the backs of rakes.
- (5) Sow from 20 to 50 pounds per green of suitable grass seeds.
- (6) Rake the turf lightly to cover the seed that has just been sown, and roll.

Approximate cost per green for materials, \$38.

Renovating Fairways

On a typical fairway that is worn, has bare patches, and generally needs attention, methods such as the following are usually attended by successful results, though it should be remembered that cost, circumstances of soil, season, need for drainage, etc., may cause modifications. However, under average conditions the following scheme would be a good one:

(1) During April, May, August, or September cut the grass as closely as possible.

(2) Apply the following per acre:

10 loads or more of mushroom soil and 500 pounds of Stumpp & Walter Co.'s Fair-Green Fertilizer.

(3) Harrow and cross-harrow, using a machine of the sharp-tooth type.

(4) Sow per acre 50 to 100 pounds of Stumpp & Walter Co.'s Fair-Green Mixture of Seeds, regulating the quantity of seed to the quality of the turf already there. In other words, use 50 pounds per acre where the turf is good and the full 100 pounds per acre where the turf is thin and poor.

(5) Drag over the fairways a bush harrow, as described on page 3; this is a home-made implement consisting of a stoutly constructed framework of wood to which is attached a collection of twigs and branches.

(6) Roll.

Approximate cost of materials per acre, \$125.

MODIFICATIONS: On a soil already supplied with an excess of humic material, ten loads or more of sand or of sandy soil should be substituted for the mushroom soil. Again, on a soil showing signs of acidity, the above process may be carried out, generally using sand instead of mushroom soil, and preceding the whole dressing by one of pulverized limestone. Use from 1,000 to 3,000 pounds per acre of pulverized limestone and allow two weeks to elapse after applying the limestone and before commencing to renovate. The usual indications of a soil's need for an application of limestone are discussed in a later section. We also draw attention to the information given in tabular form between pages 20 and 21.

Renovating Tees

The renovation of tees may well be carried out along the same lines as that of greens: as a matter of fact, it is a simple matter, when preparing any composts or top-dressing materials for the greens to prepare an extra load or so to use on the adjacent tee.

Tees are often neglected, but it should be remembered that they need even more care than greens, because the wear is so much greater and frequently there is no provision made for watering them.

A turf nursery, specially sown down with grass seeds suitable for tees, is of great value. When the grass on a particular section is damaged to the extent that it is bare, cut out the turves and re-sod, changing the teeing marks to another section of the tee to enable the patched portion to heal. It is a great advantage to have tees sufficiently large to take care of this: the modern tendency in course-designing is to provide for large tees. We offer seeds for tees on page 7.

The Grasses Used on Golf Courses in the Northern United States

There need be no mystery in the question of varieties of grass suited to golf courses. It is unfortunate that the few plants which are suitable for forming a turf possess very high-sounding botanical names. Further, the several botanists who have given the matter attention in the past have found it necessary to rename varieties, thus adding to the difficulties. Is there anything more likely to make confusion worse confounded than to find that the fine-leaved variety of Sheep's Fescue, for example, has among other scientific names the following: *Festuca orina angustifolia*, *Festuca capillata*, *Festuca tenuifolia*? There is little excuse and little need for a golfer to worry about botanical names, but in order that the reader may have them for reference we include them in the tabulated notes on the following pages. We always suggest that the common English name is preferable.

Of those grasses suitable for the formation of a golfing turf in the northern states, a rough division may be made into sorts which possess fine but flat leaves and those with fine but needle-shaped leaves. The flat-leaved grasses include the Bents, the Blue Grasses, the Rye Grasses, and some of the Fescues. The needle-shaped varieties comprise most of the Fescues.

The Bents

In the order of their fineness and their value for golf courses, the Bents may be listed as follows:

Velvet Bent, Creeping Bent, Rhode Island Bent, Colonial Bent or Brown-Top, and Red-Top.

Velvet Bent. This comprises the most desirable portion of the best samples of seed sold under the name of "Creeping Bent." It is not procurable alone, but always in mixture with Creeping Bent, Rhode Island Bent, and Red-Top. "Creeping Bent" also contains Carpet Bent, which, as its name implies, when established on a putting-green, a carpet is formed of velvet-like texture.

Creeping Bent. As known commercially, seeds of this would be more correctly labeled "Mixed Bents." Creeping Bent is a name that has been given, for a number of years, to a mixture of Bents collected in limited quantities in a few districts in southern Germany. It consists of true Creeping Bent combined with Rhode Island Bent, Carpet Bent, and Velvet Bent. "Mixed Bents," when established give a turf of wonderful fineness on almost all soils. They are used very largely for putting-greens, both alone and in mixture with other grasses, particularly Red Fescue. There is but one thing which limits their use, and that is their cost. Were it not for their very high value, they would be suitable also for fair-greens.

Rhode Island Bent. A variety which is found growing in a few isolated sections in New England. It is almost as fine as Velvet Bent, but, as collected at the present time, we find it almost impossible to obtain it in any reasonable degree of purity or with anything but very moderate vitality. Fortunately, exactly the same plant, botanically, is produced commercially in other parts of the world, and is offered by us under the name of "Colonial Bent."

Colonial Bent. This is the Rhode Island Bent of New England, but is collected elsewhere, and has a far higher

purity and a much greater germinating power than native Rhode Island Bent. It produces a turf of wonderful fineness, and for putting-greens and fine lawns there is but one grass which is better, and that is "Creeping Bent."

Red-Top. One of the best-known and largest-used grasses in America today. It is very valuable for fair-greens and tees, and it may be used liberally, because it is one of the least expensive grasses we have. When "Creeping Bent," and Colonial Bent are obtainable, and when a club's appropriation will permit of their purchase, we do not recommend Red-Top for putting-greens. But when these imported varieties cannot be used, Red-Top of a superfine grade is the only grass to take their place. Putting-greens need a comparatively small quantity of seed, and the imported Bents are urged instead of Red-Top where possible; the ultimate result in satisfaction will far outweigh the slight additional cost where "Creeping Bent" or Colonial Bent are used.

In our opinion the Bents are best sown in conjunction with other types. All the Bents or *Agrostis* varieties are at their "peak" just as the summer begins to wane, a point which it is well to take into consideration if maximum results are preferred, as they generally are, during the whole season. This is one of the reasons why we generally do not recommend a seeding to be made with only one kind of grass. Another reason is that the conditions of temperature, of rainfall, and of soil vary from year to year. Some conditions are more favorable to some varieties of grass than others. It is, therefore, always an *insurance* if a *mixture* containing several varieties of seed be sown.

The Blue Grasses

Kentucky Blue Grass. Very desirable as a fairway grass, particularly on medium to heavy soils that have been limed or which stand on a limestone foundation. Kentucky Blue Grass is of fine color and is quick to germinate. It is not, however, considered suitable for putting-greens, except, perhaps, in those sections of the country where the soil is particularly favorable.

Annual Meadow Grass (*Poa annua*). A widely distributed weed grass frequently found in putting-greens. It is a dwarf plant, readily distinguishable on account of its light green color and the fact that it may be found in flower practically during the entire season. To eradicate it when in small patches, use a hole-cutter to take out the patches and replace them with good turf. When firmly established it is a good plan to withhold any dressings of lime or fertilizer containing lime, such as bone meal; to fertilize every few weeks during the growing season with sheep manure, sulphate of ammonia, nitrate of soda, or other materials which will have the effect of making the soil slightly acid. Seed of the Annual Meadow Grass is not obtainable.

Canadian Blue Grass. Somewhat similar to Kentucky Blue Grass but is of a less pleasing color. It is a trifle coarser, and is generally regarded as a substitute for Kentucky Blue Grass.

Rough-stalked Meadow Grass. A desirable ingredient in mixtures, both for fairways and putting-greens *under shade*.

The Fescues

Red Fescue. This grass is procured both from Europe and Australasia, the latter being known commercially as "Chewing's Fescue." It makes a delightful mat-like turf of a pleasing deep green, almost brownish green, color. The leaves are very fine, needle-like, and bristly. Red Fescue makes excellent putting-greens and fairways, suits almost all soils, including those of a light and sandy nature, and does remarkably well in shade. Experience seems to show that Chewing's New Zealand seed is preferable for golf-courses, to that of European origin. Red Fescue loses its vitality very quickly, and samples germinating over 50 per cent in the spring are rare. The new season's crop usually arrives from New Zealand during July; this "Newcrop" seed should be specified in all fall seedlings, when a good germination and, in consequence, a good "catch" will be assured.

Hard Fescue, Sheep's Fescue, Fine-leaved Fescue, and Various-leaved Fescue. These are suitable for golf courses, especially on the fairway. Various-leaved Fescue has both needle-like and flattened leaves, while all the others have needle-like foliage. All have a tendency to "tussock" and give "cuppy" lies in consequence, and they should

therefore be sown only in conjunction with other grasses. All are ideal as a covering for bunkers.

English Rye Grass (Pacey's) and Meadow Fescue are sometimes recommended for inclusion in mixtures for fairways where *quick results* are essential. They are a trifle coarse but they are not permanent: they generously disappear after the slower Fescues and Bents are established.

Following are grasses in commerce which generally are unsuitable for golf courses in the northern states unless perhaps for the "Rough." Some are considered useless for any purpose by the Department of Agriculture at Washington (those marked *).

Timothy
Orchard Grass
Tall Oat Grass
Foxtail
Sweet Vernal
*Crested Dog's-tail

Italian Rye Grass (Used largely for winter greens in the South)
Tall Fescue
*Wood Meadow Grass

Seed Samples

We prepare samples in glass vials for permanent reference of those grasses which are in general demand for golf-course purposes. It will be a pleasure to send one of these sets to the chairman of your green committee on request.

The Stumpf & Walter Co.'s Position

We do not build new courses, nor do we undertake construction work of any kind.

We have no architects, expert constructors, or greenkeepers in our employ.

We do not supply "commercial grades" of seed at competitive prices.

BUT

We are able to help you with your turf problems and to suggest the best methods of producing turf at the minimum expense.

BUT

We have associated with us men who have made grasses and turf production their life study. Their assistance is at your disposal without cost to you.

BUT

We supply a complete range of the choicest, cleanest seeds it is possible to produce, and we offer them at moderate prices with a practical knowledge of the purpose for which they are intended.

Crops Recommended for Green Manuring

Seeds broadcasted thickly and the crop plowed under the land, there to decay and add humic material and fertilizing elements to it.

For early spring seeding before frosts are entirely over.

***Spring Vetch**.....

Quantity per acre when sown alone	Price, subject to market change
100 lbs.	Lb. 10 lbs. 100 lbs.
100 lbs.	\$0 20 \$1 50 \$12 00
Pk.	10 bus.

***Canada Field-Peas**.....

3 bus.	\$1 50 \$5 00 \$45 00
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Spring Rye.....

2 bus.	1 00 3 50 32 50
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For seeding after settled warm weather has commenced. Frost kills these varieties.

***Soy Beans, Mammoth Yellow**.....

2 bus.	1 25 4 50 42 50
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***Soy Beans, Ito San**.....

2 bus.	1 00 3 50 32 50
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***Cowpeas, New Era**.....

2 bus.	1 25 4 50 42 50
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***Cowpeas, Whippoorwill**.....

2 bus.	1 50 5 00 45 00
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Japanese Buckwheat.....

4 bus.	1 00 3 00 27 50
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For seeding during the summer and fall. These stand frost; they are frequently sown to remain until the spring, to be plowed under then.

Winter Rye.....

2 bus.	1 00 3 50 32 50
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Winter Wheat.....

2 bus.	1 00 3 50 32 50
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***Winter or Hairy Vetch**.....

100 lbs.	\$0 25 \$2 25 \$20 00
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It is desirable to sow combinations of the above. When mixed together the stated quantities per acre should be reduced in proportion. Varieties marked * are legumes, and are of additional value on account of the nitrates which are added to the soil by the colonies of bacteria found in the nodules on the roots of leguminous plants.



The seventh green on the beautiful Ekwanok Golf-Course at Manchester, Vt. Grass Seed supplied by Stumpf & Walter Co. for nine successive seasons

Mixed Grass Seeds for Golf Courses

Putting-Green Seeds

If required for new work, or where the entire seeding of all greens is necessary, it would be best to consult us for suggestions as to the formula for the soil and location. But for average conditions of soil and aspect, the following mixtures are always in stock, ready for immediate shipment.

Standard Putting-Green Mixture. Composed of "Creeping Bent," Fancy Recleaned Red-Top, Fine-leaved Sheep's Fescue, and Chewing's Fescue—all of the very highest purity and germination. **Lb. 75 cts., 5 lbs. \$3.50, 25 lbs. \$16, 100 lbs. \$60.**

Special Putting-Green Bent Formula. "Mixed Bent," containing Velvet Bent and Carpet Bent, formerly widely sold under the name of "Creeping Bent," is gathered in Central Europe and is exceedingly scarce and high-priced. On account of its wonderful fineness and suitability to certain conditions, it is sometimes advisable to sow a mixture containing an increased proportion of this fine grass. We consequently offer a formula that is specially high in "Creeping Bent." **Lb. 90 cts., 5 lbs. \$4.25, 25 lbs. \$20, 100 lbs. \$75.**

FAIR-GREEN MIXTURE. The variety of Grass that grows naturally on the particular soil should form the basis of a Fair-Green formula. Where an extensive seeding is to be done, we always like to recommend and supply a special formula, according to the requirements of the soil. For limited seedings, our standard formula is good, and we know it will give satisfaction; it is well balanced, and the Grasses of which it is composed will give an even, tough, and lasting turf. **Lb. 55 cts., 5 lbs. \$2.50, 25 lbs. \$11.75, 100 lbs. \$45.**

SPECIAL "ROUGH" FORMULA. Consists of the taller-growing hardy perennial grasses in combination with gorse, yarrow, and other plants suitable for the purpose and least likely to give serious trouble as weeds should their seed be carried by the wind and other agencies on to your greens or fairways. **Lb. 50 cts., 5 lbs. \$2.25, 25 lbs. \$10, 100 lbs. \$35.**

SPECIAL MIXTURE FOR TEES. Our formula includes only those varieties which will stand rough usage and recuperate quickly after excessive wear. **Lb. 60 cts., 5 lbs. \$2.75, 25 lbs. \$13, 100 lbs. \$50.**

MIXED FESCUES FOR BUNKERS. A mixture of Red, Hard, Dwarf, Fine-leaved, Various-leaved, and Tall Fescues. Excellent for mounds, bunkers, and exposed sandy situations in the "Rough." **Lb. 90 cts., 5 lbs. \$4.25, 25 lbs. \$20, 100 lbs. \$75.**

SPECIAL MIXTURE OF GRASS SEEDS FOR HOT, DRY SOILS. Recommended chiefly for sowing in the fall to renovate both greens and fairways that have suffered from the effects of summer heat and drought. Consists of mixed Fescues and Rough-stalked Meadow Grass, as outlined on page 17. **Lb. \$1, 5 lbs. \$4.75, 25 lbs. \$23, 100 lbs. \$90.**

Sundry Seeds for Golf Courses

YARROW (*Achillea Millefolium*). A deep-rooting, drought-resisting plant with delicate, fern-like leaves, sometimes used on tees or putting-greens. May be sown alone (when one pound is sufficient for a plot of ground 40 by 40 feet) or in combination with grass seeds. **Lb. \$2.50.**

GORSE, or FURZE (*Ulex europeus*). This shrub makes British courses bright with its yellow blossoms in the spring. It is a slow grower and it will be some years before it will be effective. Broadcast ten pounds per acre over the "rough" and harrow in. Not recommended for the extreme North. **Lb. \$1.50.**

There are no inherent virtues in "special mixtures;" neither are there any secrets which a botanist cannot disclose to you in a few minutes. If you use the above mixtures or if you adopt our suggestions made for your special requirements we are always ready to furnish on request the formula we employ.

GRASS SEEDS

OF KNOWN PURITY AND PROVED VITALITY

The Grass Seed problem, whether applied to the farm or course, is one that can be rightly solved only when the grower fully takes into consideration four essential details: SEED, SOIL, LOCATION, and CLIMATE. Our Mixtures are prepared with a thorough knowledge of the grasses indigenous to most soils within 1,000 miles of New York. Advice regarding mixtures for special locations freely given on request. We will gladly furnish certificates showing the purity and vitality of any of the following varieties:

GENERAL LIST OF GRASSES

*The "Ligule" is a small membranous lip found on the inside of the leaf at a point where the leaf and stem part company. If a grass shoot be cut across with a knife, the leaves will be found folded flat with some varieties and rolled in others. The ligule and the manner of folding are important means whereby varieties may be distinguished.

†Indicates desirability of using mixtures rather than one variety for turf.

‡Dwarf habit indicates suitability of a variety for turf.

VARIETY	DESCRIPTION*	PERIOD OF MAXIMUM DEVELOPMENT †	USE	SOIL SUITABLE	Height Ins. if Uncut ‡	Weight Per Bushel	PRICE
					Lb.	10 lbs.	100 lbs.

AGROSTIS VARIETIES OR BENTS

Creeping Bent (<i>Agrostis species</i> ; Fiorin; Mixed Bents).	"Creeping Bent," a name used for many years for seed collected in Central Europe; a mixture of <i>A. vulgaris</i> , <i>A. canina</i> , <i>A. palustris</i> , <i>A. stolonifera</i> .	Early fall	Makes velvet-like, thick, beautiful, soft putting-greens and lawns; used largely in conjunction with Red Fescue.	All; especially light, moist land.	12			
Colonial Bent (<i>A. tenuis</i> ; <i>A. vulgaris</i>).	Leaf-blades very narrow, flat; plants slightly creeping. Forms a dark green turf of velvety texture. The young leaves are rolled in the bud.	Early fall	Splendid for putting-greens and fine lawns. Identical with Rhode Island Bent.	All soils.	24 16	\$2 75 2 25	\$25 00 20 00	\$225 00 175 00
Red Top (<i>A. palustris</i> ; <i>A. alba</i>).	Leaf-blades narrow, becoming very narrow with turf cultivation; plants slightly creeping. The young leaves are rolled in the bud. Prominent ligule.	Early fall	Valuable for fair-greens and tees, but Creeping and Colonial Bent being finer and more permanent are recommended for putting-greens. Splendid for hay and pasture fields. Superfine Quality Recleaned Quality	All soils.	18 18	2 50 2 00	22 50 17 50	200 00 150 00

POA VARIETIES OR MEADOW GRASSES

Canadian Blue Grass (<i>Poa compressa</i>).	Leaf-blades narrow, flat; plants slightly creeping; stems flattened; color gray-green.	Early summer	Valuable for tees and fairways; not much used for greens, Kentucky Blue Grass being more recommended. Good bottom grass.	All; clays and those with lime.	12	18	\$0 60	\$5 50	\$50 00
Kentucky Blue Grass (<i>P. pratensis</i> ; June Grass).	Leaf-blades very narrow, flat; plants slightly creeping. Color a deep vivid green. Somewhat slow, being more effective the second year than the first. Ligule short and thick. The young leaves are folded in the bud.	Early summer	Ideal ingredient in fairway mixtures; frequently used for putting-greens. Largely employed for lawns; makes the best, sweetest, and most nutritious pasture.	All; particularly those containing excess of lime.	12				
Rough-stalked Meadow Grass (<i>P. trivialis</i>).	Leaf-blades narrow, flat; plants not creeping. The young leaves are folded in the bud. Lower surfaces of the leaves are very glossy.	Early summer	Suited for putting-greens, fairways or lawns under trees. Quite the best grass for shaded situations. Makes an exquisite turf.	All soils, including sandy.	27 21	80 70	7 50 6 50	70 00 60 00	110 00
Wood Meadow Grass (<i>P. nemoralis</i>).	Leaf-blades narrow, flat; plants not creeping. A medium dark green. The young leaves folded in the bud. Leaf joints black.	Late spring	Of limited use in America; cannot be traced as permanently adapted to our climatic conditions.	All of medium texture.	12	20	1 35	12 50	110 00

FESTUCA VARIETIES OR FESCUES

Hard Fescue (<i>Festuca duriuscula</i>).	Leaves wire-like and stiff, not flat; plants tend to grow in tufts.	Late spring	Must be carefully balanced when in golf mixtures, otherwise may give "cuppy" lies.	Sandy, thin, dry soils.	12	20	\$0 80	\$7 50	\$70 00
Red Fescue (<i>F. rubra</i>), Chewing's, N. Z.	Leaves wire-like and stiff, not flat; plants have a tendency to creep, but frequently form tufts. Base of shoot reddish.	Summer	Excellent for putting-greens, tees, and fairways; also hay- and pasture-fields. Gives fair results under trees. Sometimes attacked by fungus.	Satisfactory on dry, poor land.	12	27	1 15	10 00	90 00
Red Fescue, European.					12	27	90	8 50	80 00

Stump & Walter Co.'s GOLF TURF

GENERAL LIST OF GRASSES, continued

VARIETY	DESCRIPTION*	PERIOD OF MAXIMUM DEVELOPMENT†	USE	SOIL SUITABLE	PRICE		
					Height Lbs. if Uncut Weight Per Bushel	Lb.	10 lbs.	100 lbs.

FESTUCA VARIETIES OR FESCUES, continued

Sheep's Fescue (<i>F. ovina</i> ; English Fescue.)	Leaves wire-like and stiff, not flat. Ligule reduced to short ears.	Late spring	Occasionally used on putting-greens, although the fine-leaved variety is preferable. Excellent for fairways and tees.	Any except wet land.	12	16	\$0 85	\$8 00	\$75 00
Fine-leaved Sheep's Fescue (<i>F. ovina angustifolia</i> ; <i>F. capillata</i> ; <i>F. tenuifolia</i>).	Leaves wire-like and stiff, not flat; very fine. Color a beautiful dark green. Bottom leaves are bristly; upper leaves flat. Fine dark green. Plants of a tufted habit, though slightly creeping.	Late spring	Used on putting-greens and tees. Gives fair results where situation is shaded.	Any dry soil.	12	22	1 00	9 50	90 00
Various - leaved Fescue (<i>F. heterophylla</i>).	Leaves very broad and flat. Base of leaf-sheaths red. The young leaves are rolled in the bud.	Late spring	Used to a limited extent on tees and fairways; also of value as an ingredient in hay and pasture mixtures.	Light soils, rich in humus.	15	15	1 15	10 00	90 00
Meadow Fescue (<i>F. pratensis</i>).	Leaves medium broad and flat.	Summer	Useful to the golfer only for the "rough." Gives an abundance of fodder as a hay or pasture grass.	Any soil unless water-logged.	36	27	45	4 00	35 00
Tall Fescue (<i>F. elatior</i>).	Leaves very broad and flat.	Summer	Of interest to the golfer for bunkers or the "rough." Excellent for hay and pasture.	Any.	48	22	60	5 50	50 00

LOLIUM VARIETIES OR RYE GRASSES

English Rye Grass (<i>L. perenne</i>).	Leaves narrow and flat, smooth and shining; leaf-bases red. Usually lives three years. The young leaves are folded in the bud.	Summer	A rapid grower and of value as a "nurse grass" under some conditions; particularly useful where a fairway is needed quickly; valuable for hay and pasture.	Medium soil well supplied with moisture.	24	28	\$0 25	\$2 25	\$20 00
Pacey's Perennial Rye Grass (<i>L. perenne Pacei</i>).	A smaller - seeded, finer-leaved, smaller plant than the above.	Summer	Superior to the above for turf purpose; claimed to be more resistant to cold.	As above.	24	30	30	2 50	22 00
Italian Rye Grass (<i>L. Italicum</i> ; <i>L. multiflorum</i>).	An annual grass with a tendency to grow in tufts; tall; broad, flat leaves. Biennial. Base of sheaths red. The young leaves are rolled in the bud.	Early summer	In the North occasionally valuable as a "nurse grass." Being hardy and quick, it protects more delicate slower sorts; disappears after one year. In the South makes excellent winter turf, following Bermuda Grass.	Medium soil well supplied with moisture.	36	22	25	2 25	20 00

SUNDRY VARIETIES

Bermuda Grass (<i>Cynodon dactylon</i> ; <i>Capriota dactylon</i> , Scutch Grass).	A medium broad-leaved grass, strongly creeping. Does not survive winter north of Pennsylvania.	Early fall	Valuable in the South for putting-greens, fair-greens, and lawns; also for pastures and hay-fields. Binds sand.	All soils.	12	36	\$0 65	\$6 00	\$55 00
Crested Dog's-tail (<i>Cynosurus cristatus</i>).	Leaves narrow and flat. Tends to grow in tufts. The young leaves are folded in the bud. Base of leaf-sheaths yellow.	Early summer	Of limited usefulness in this country, except as an occasional ingredient in tee and fair-green mixtures.	Hard, dry loams.	24	30	70	6 50	60 00
Sweet Vernal (<i>Anthoxanthum odoratum</i>).	Narrow, flat leaves. The young leaves are rolled in the bud; leaf-sheaths hairy.	Late spring	Very fragrant when drying. Occasionally used in mixtures of seeds for hay-fields.	All soils.	18	10	1 00	9 50	90 00
Meadow Foxtail (<i>Alopecurus pratensis</i>).	Medium broad, flat leaves. Flower-heads resemble timothy. Base of leaf-sheaths violet. The young leaves are rolled in the bud.	Late spring	Useful to the golfer only for bunkers and the "rough." As a field-grass gives large yields early.	All soils.	36	10	85	8 00	75 00
Tall Oat Grass (<i>Avena elatior</i> , <i>Arrhenatherum elatius</i> ; False Oat Grass).	Very broad leaves; plant has the appearance of a slender, small oat.	Early summer	Useful to the golfer only for the "rough" or for bunkers. Valuable for hay and pasture.	All soils.	48	14	50	4 50	40 00
Orchard Grass (<i>Dactylis glomerata</i> ; Cockfoot).	Large plant, bluish green in color, with flattened leaf-bases. Ligule prominent. The young leaves are folded in the bud.	Late spring	Interest of the golfer only for the "rough." Widely used for hay and pasture, for which purposes it is of additional value in that it thrives under trees.	All soils.	48	14	45	4 00	35 00
Timothy (<i>Phleum pratense</i> ; Herd's Grass; Cat's Tail).	Very broad leaves; coarse, vigorous plant. Base of stem bulbous. Ligule small, pointed. Young leaves rolled in the bud.	Summer	Useful to the golfer for the "rough." The most important American grass for hay and pasture.	Rich land.	36	45	20	1 75	15 00

1922 Prices of Grass Seeds

In a period when values of many commodities show a recession, it is with regret that we announce an increase in price of many varieties of choice grass seeds over last year. The short supply behind this condition is unprecedented, and it may be laid to the following causes:—

1. **Light seed crops**, due to the very dry summer and fall experienced in practically every part of the world. This peculiarity of climate, however, favored a heavy yield of corn and many other of the grain crops.

2. **Less seed is gathered in Europe than formerly.** Changed conditions due to the war have turned the attention of many, who for generations have gathered the choicer grass

seeds, to efforts more directly concerned with the food-supply and with manufacturing interests.

3. **Less land is devoted to grass-seed production.** High values of corn and other food crops during a succession of years have resulted in an extension of the areas producing them, with a corresponding reduction in the territories yielding domestic grown Red-Top and Blue Grass.

In spite of difficult conditions we are in a position to offer choice samples of remarkably high purity and of the strongest vitality; these represent real values, the purchase of which is true economy. In a period of scarcity it is necessary to exercise the greatest caution in regard to seed quality.

Seeds—Price versus Quality

The Stumpp & Walter Co. sell their seeds strictly as of proved maximum purity and maximum vitality. In other words, they do not allow seeds to leave their premises until the findings of their Analyst, supported by certificates of Federal and State testing departments, show the highest possible percentage of purity and of germination.

What exactly does this mean, and of what importance is it to you? Take, for instance, a sample of Red-Top of a quality that would be sold as the Stumpp & Walter Co.'s Superfine Grade: such a sample would have a certified purity, perhaps, of 96 per cent and a certified vitality of, say 95 per cent. This means that of any thousand tiny granules taken from the sample, 960 of them are pure, plump, healthy seeds of Red-Top, and that only 40 grains out of 1000 are doubtful. There may be among these 40, and generally are, broken Red-Top seeds, empty husks, and short lengths of stems of the grass. There may, too, be found an occasional *weed seed*. A germination of 95 per cent, of course, means that when 1,000 seeds are sown on suitable soil, 950 of them are potential Red-Top plants. A sample of Red-Top of the high percentages mentioned is very rare and is seldom offered outside of the Stumpp & Walter Co.'s Superfine Grade. Instead of 96 and 95 per cent, a purity of 85 per cent and a germination of 85 per cent is quite frequently found in "high-grade" commercial samples. Think what this means: in 1000 seeds, 150 questionable grains instead of 40; or *your broken seeds, empty husks, short lengths increased four times*. Your risk of introducing weeds increased from the irreducible minimum to an abundant certainty. A germination of 85 per cent means, with the 1000 seeds that we have in mind, that only 850 that are sown will grow, where 950 will grow in the case of the Superfine sample. In other words, one pound of the Superfine Quality Seed will produce over 10 per cent more plants than will one pound of the ordinary good commercial grade, in

addition to its being as free from weed seeds as painstaking care can make it. Now we have been talking of Superfine and *good* commercial samples of Red-Top. Commercial analysts will tell you that samples of Red-Top are not uncommon with a purity as low as 40 per cent and with a germination of 30 per cent down to zero. A simple calculation will convince anyone that the purchase of such a sample for seeding purposes *at any price at all, however low*, is a spendthrift policy. In the above example we have taken Red-Top, a seed that is much in commerce and, because the farmer uses it, the sale of it is well and very properly watched by Federal and State officials. In the case of those grasses where the demand is much less, such as Red Fescue or Mixed Bents, (Creeping Bent), and where the cost permits possible high rewards to the dishonest, careless, or ignorant dealer, the figures are even more startling:—

	Lowest figures that have come before our Analyst		Average of a good quality commercial sample		Maximum of a particularly choice "Super- fine" sample	
	Purity %	Germ. %	Purity %	Germ. %	Purity %	Germ. %
Creeping Bent.....	15	18	45	50	75	75
Red Fescue.....	74	40	85	75	90	85
Kentucky Blue Grass...	60	14	80	60	90	87

Does not this show very clearly the absolute necessity of looking closely into the question of purity and germination before purchasing, and when comparing prices to compare these percentages too? It also shows the very great desirability of purchasing from those houses which specialize in these varieties and *which are acquainted fully with the purpose for which the seeds are needed*. The section dealing with "Weeds" is also important as bearing on this question; it will be found on page 13.

When to Sow Grass Seed

Most grass plants, if allowed to grow to maturity and produce their seed, will do so toward the end of the summer. After this seed has ripened the wind disperses it and, in many instances, carries it considerable distances. The lesson for us in this is that the late summer is the time when Nature herself sows her seed, and all other things being equal, late summer or early fall—in other words, the months of August

and September—is the best time for sowing seed, and this is more especially so if the seeding is a large one. The soil is warm at that time and it is generally in very good condition for plowing, harrowing, and rolling. After sowing, the first shower will cause the plants to show above the surface of the soil. A course constructed and sown in August or September should be in shape for play the following June; that is, if the

soil is suitable, the right varieties of seed have been sown in sufficient quantity and the season is one favorable to the growth of grass.

Sometimes circumstances demand that the seeding should take place in the spring, and that is not at all a bad time to do this work; it is the next best, after fall seeding. Seeds will not germinate anything like so quickly or so well in the spring as in the fall, chiefly because the land is cold; and a little more patience is necessary. The work may be undertaken just as soon as all frost has left the soil and the land becomes sufficiently dry to work without injury. It must be remembered that any digging, plowing, raking, or harrowing that is done when the land is wet will have the effect of solidifying it into hard lumps, and it may take several years to get the land into good condition again. This is one of the fundamentals of agricultural practice, and it is always advisable to be extremely careful and

very patiently delay working on land until all excess moisture has left it.

Grass seed may be sown in the late autumn, and it is not uncommon to sow it on the snow, the idea being that, as the snow disappears, the seed is gently deposited in the soil, and it will start to grow earlier than it would be possible to work the land after waiting until it has dried. Of course, this can only be done where the land is level, as anything in the nature of a washout when the snow disappears in the spring will mean that all the seed deposited will be wasted. We have thus considered fall, spring, and winter seeding. There is only a month or so in the very driest and hottest part of the summer during which large quantities of seed cannot be economically sown. It is a great advantage if land be prepared early, and allowed to lie fallow during these hottest months. Occasional rains will start weed seeds into growth, and frequent harrowings or rakings will destroy them.

Hints on Sowing Grass Seeds

There are some very important points to remember in the sowing of seeds and among them are:—

Have the soil properly prepared. Not only must it be of such a nature that the young plants will be supported, nourished, and fed, but it must be reduced to the very finest possible condition, free of sticks, stones, clods of soil, pieces of fresh manure, etc. One can hardly spend too much time, care, and attention in the preparation of the soil; before entrusting to it the best seed you can buy, see that it is brought up to the very finest pitch of perfection. Screen the uppermost layer if your appropriation permits. Leave as long a period as possible between preparing the soil and sowing.

Sow the seed only on a still day. If you attempt to place seed on or into the ground when there is a wind blowing, you lose part or all of it, and you will be at a loss to account for patches, or large or small areas that are bare when later they should be covered with verdure.

Do not cover the seeds too deeply. Most grass "seeds" are very much smaller than they appear. The seeds, as we know them, are husks which contain at one end the very tiny grain, and it is only from this grain that the young plant is developed. When we thus consider how very small the seeds actually are, it will be realized how easy it is to cover them too deeply. The thing to do is, as soon as the seeds have been scattered onto the soil, to very lightly stroke the soil with rakes, being careful to just cover the seed and no more. If there is any doubt in your mind as to your being able to cover seed sufficiently lightly, you may take a

portion of soil and mix the seed with it; then scatter the soil-and-seed mixture and roll.

Roll immediately the seeds are sown. If you sow seeds and do not roll, they will be largely wasted. Rolling at once compacts the soil, and water from the lower layers of the soil is induced immediately to come to the surface by capillary action, and growth will commence, even if the weather is comparatively dry. It is generally not necessary to water newly sown land: better to wait until the young seedlings appear, except in the case of a settled spell of drought, in which case watering may be necessary.

What quantity of mixed seeds to sow. There is no fixed rule as to this, but one thing is certain: disappointment is bound to arise if seeds are not sown freely. We frequently hesitate to recommend the quantity of seeds that we know is necessary for success, fearing that the charge will be brought against us that we are more anxious to sell a large quantity of seeds than to study our customers' interests. Actually, however, nothing is more certain than disappointment if seeds are skimped. For ordinary results we recommend 200 pounds (8 bushels) or more per acre of mixed seeds for fairways, and 75 pounds (3 bushels) or more per green. These quantities may well be increased with economy, for we have most certainly found that within reason the thicker one sows grass seeds the quicker does one obtain a playable turf and the better is its quality. Further, it is but reasonable that weeds are discouraged the more they receive competition from plants which are introduced: in other words, the thicker we seed the less chance have weeds to give trouble.

An Appreciation We note the following in *The Sun and New York Herald* of August 8, 1920: "One of the best golf courses in the Metropolitan district is that of Hollywood at Deal, N. J., where the international professional best ball match between the American and British teams of Hagen and Barnes and Ray and Varden was played last Sunday. Here is a course, the soil and turf of which are as close to perfection as there is any need for these to come."

We note the following in *The Globe* of September 22, 1920: "Both Varden and Ray have agreed that Hollywood is the best course that they have ever seen in America, and they have played a lot of them."

NOTE.—On the Hollywood course the Stumpf & Walter Company's Seeds and Fertilizers have been used exclusively, and their advice followed, for the past five years.

Quantities of Grass Seeds to Sow

There is considerable variation of opinion on this point, but generally we find practical turf-growers with years of experience lean toward heavy seeding. We give below, in tabular form, our ideas on this point, and we would say that,

although we have known of cases of disappointment traceable to too light seeding, it is rare to see a case where seed has been sown so thickly that failure has occurred, due to that cause.

Quantities Recommended

(a) Putting-Greens

Separate varieties	Mixed Bents (Creeping Bent)	30	\$60.00	45	\$90.00	60	\$120.00
	Chewing's New Zealand Fescue.....	75	67.50	100	90.00	125	112.50
Mixtures	Special Putting-Green Bent Formula.....	50	37.50	75	56.25	100	75.00
	Standard Putting-Green Mixture	50	30.00	75	45.00	100	60.00

(b) Fairways

Fair-Green Mixture. Per acre.....	150	67.50	200	90.00	250	112.50
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(c) Rough..... 50 to 100 lbs. per acre (\$17.50 to \$35)..

(d) Tees 1 pound per each 200 square feet..

NOTE.—Most of our grass mixtures weigh 25 pounds to the measured bushel.

Use one-quarter to one-half the above quantities when renovating existing turf.

Always leave as long a period as possible between preparing new land and sowing seed, to give an opportunity for weeds to grow and be destroyed.

Seeding a Bunker

The greenkeeper is often confronted with the problem of covering with verdure a recently constructed mound or bunker. Top-soil is either not available or the shape of the mound and its steep grades render impossible the spreading of the coating of top-soil necessary to carry grass. We suggest the following method:

Equip your men with grub hoes or mattocks (suitable types are listed on page 28) and with pails containing a fifty-fifty mixture of soil and rotted manure or mushroom soil, or compost, to which has been added five pounds of seed of Mixed Fescue Grasses for Bunkers. Now, with the mattocks open up holes in the sides of the mound about 5 inches across

and 5 inches deep; let the holes be evenly spaced about 15 inches from center to center. Fill the holes with the mixed compost and seed, and tamp firmly.

A weedy bunker or mound on which plantain, chickweed, dandelion, crab-grass, and other weeds flourish is a menace to all your greens within half a mile or more. Its shape frequently prevents its being cut, and the consequence is that weed seeds are allowed to ripen and blow all over the course. On the other hand, the Fescues are excellent grasses for putting-greens, and they may be allowed to seed on the bunkers without risk of doing any damage. Further, Fescues are quite the best grasses for exposed, dry, sandy situations.

Should Clover Be Included in Golf Seeds?

Of the several varieties of clover in commerce, there is but one which is of sufficiently dwarf habit to enable it to live under the constant cutting and rolling of the golf course, and this is White Dutch Clover. Until recent years it has always been a custom to include this White Dutch Clover in any mixture of seeds for the lawn, the reason being that the plants grow very speedily and root very deeply. In consequence, a turf is very quickly obtained after sowing with a clover mixture, and the clover generally stands dry weather very well, its roots drawing moisture from deep in the soil, when the shallow-rooting grasses are suffering from drought. Golfers have long recognized the objections to white clover, particularly on the greens, and also to an extent on the fairways. The comparatively broad leaflets of white clover look strangely out of place where a fine turf is required. Clover plants wear very badly. While grass will stand up well under heavy tramping, clover bruises down into a sticky mass. Old customs die hard, and it is frequently

still urged that a mixture of grasses and clover be sown on a fairway, but the modern greenkeeper regards clover absolutely as a weed under all conditions, and it is to him a very noxious weed in that it is so hard to eradicate. The drought-resisting properties of white clover are largely taken care of by the Fescue grasses which are widely used nowadays and which give good results in dry situations.

When the mistake has been made of including white clover in a mixture of seeds for a putting-green, or when clover has appeared as being one of the weeds natural to a soil, the greenkeeper is confronted with the problem of removing it from the turf. The following is the best course to pursue:

(a) Thoroughly rake the green with very sharp fine-toothed rakes. This will tear out quite a quantity of the creeping stems of the white clover, and it will further have the effect of opening to the air the soil surrounding the roots of the grass plants, thereby stimulating them.

Stumpf & Walter Co.'s GOLF TURF

(b) Apply Stumpf & Walter Co.'s Anti-Clover Manure at the rate of 75 to 100 pounds per average green, first mixing the manure with twice its bulk of sand, if the soil upon which the green stands is heavy; and of good soil, compost, screened mushroom soil, or humus if the green is on very light land.

(c) Work the preparation into the green by rubbing the turf with the backs of the rakes.

(d) Repeat this treatment at least every spring and fall. If play permits, do it twice every spring and fall, and continue the process until the clover is eradicated.

Stumpf & Walter Co.'s Anti-Clover Manure works upon

the principle of stimulating and feeding the grass plants, but neglecting the clover, which is permitted to starve while the grass is fed. The grass, naturally, crowds out the clover.

On land from which you are discouraging clover, never use fertilizers showing a high phosphoric acid content (see pages 20 and 21) and never apply lime. If indications point to the necessity for applying lime, and at the same time you are endeavoring to rid the turf of clover, you may sweeten the soil with charcoal; also look into the matter of drainage. Greens on to which surface water drains are frequently infested with clover; diverting this water will result in cleaner greens.

Weeds in Newly Sown Turf

As a premise it is safe to say that weeds will always appear with young grass. We ask anyone who has had any experience at all with green-keeping, gardening, or farming what he would expect if he were to prepare a piece of land for seeding up to the point where the seed should be sown, *but not to sow any seed*. Would he expect the land to remain free of plant-life for years after, simply because he had dug the land so carefully, raked it so thoroughly, maybe had worked on it for perhaps several years. Would he expect it to be weed-free. He would not. A few days following the first warm shower he would expect to find—and would find—the seedlings of thousands of weed seeds that are always in soil and are always blowing on to the land from surrounding areas. If he still allowed his land to remain untended, he would in the fullness of time have his plantains, docks, chickweed, self-heal, and dozens of other weeds in full possession, simply because soil absolutely free of weed seeds does not exist in territory where plants will grow. Soils may vary, and do vary considerably, as to the quantities of weed seeds they contain, but it is a matter of degree only, and we can describe a soil as "very clean," but never can we describe it as "weed-free."

The weed seeds germinate only when they are sufficiently near the surface, and in cleaning a soil the thing to do is to rake or hoe the land as soon as the weeds appear, which will cause them to die, but the turning will bring close to the surface other weed seeds, the next turning others, and so on. It may be possible, over a period of time, in this way to make a soil almost weed-free, but we have never known one entirely weed-free.

In sowing down new seed, therefore, one must not be disappointed if some weeds appear along with the young grasses. And one should not do the obvious thing, which is to at once accuse the seedsman of supplying seed containing weeds: do not do this until you are sure that a similar area not sown would not produce the kind of weeds that are showing in the new turf, and until you have had a

sample of the seed analyzed by a competent botanist and the quantities and varieties of weed seeds it may contain reported to you. It is always advisable to keep, for reference, in sealed packages, small representative samples of each kind of seed purchased and sown: if later you have any question in your mind as to the purity of the seed, you are then in a position quickly to decide one way or another. If you find a strange weed introduced into your land, and if your botanist's reports state it is in the seed sample, you have a definite cause for complaint against your seedsman.

Thus, weeds in greens are always to be expected and provision must be made to eradicate them (in this regard see page 14); but labor is costly, and it is but common sense to give the maximum preparation to the land and to sow only seeds of the maximum purity. Assume, for the sake of argument, that we have three samples of Blue Grass; one bad, with a purity of 60 per cent; one of fair commercial quality, 75 per cent pure; and one of the highest superfine quality, 90 per cent pure. Taking 1,000 grains from each we would have 400, 250 and 100 grains respectively of impurities. Assuming that but 1 per cent of these impurities are weed seeds (they are generally more), then in every 1,000 seeds of the first we sow 4 weed seeds, of the next, 3, and of the next but one trace, all of which will have to be removed later when in the seedling stage. It is obviously a foolish policy to intentionally sow seeds of weeds which later have but to be removed.

Will you conduct the following experiment when sowing seeds?

Prepare a piece of land—the size makes little difference, a space 10 by 10 feet would be ample. Dig it, top dress it, rake it, fertilize it—just as you treat the seeded portion of your land except that you sow no seed. If in the course of a few weeks you are rewarded with a crop of weeds on your newly sown greens or fairway, it will add greatly to your peace of mind to turn to your unseeded patch and find that the same weeds are growing there, and, in consequence, have not necessarily been sown with your grass seeds.

The United States Golf Association (Green Section)

Every Club should identify itself with this official organization. Not only for the very practical and up-to-date green-keeping pointers that are given in the Bulletin which is published, but also because by so doing support is given to a movement which is calculated to improve generally turf conditions throughout the country. Particulars are obtainable by communicating with Mr. W. B. LYDENBERG, Executive Secretary, P. O. Box 313, Pennsylvania Avenue Station, Washington, D. C.

How to Eradicate Weeds

Weeds in fallow land are easily destroyed by cultivating or hoeing the soil, and we urge strongly that, before any land is sown down to grass, as long a period as possible be allowed to elapse between the final preparation of the ground and the sowing of the seed, to permit the weeds to grow and to give the constructor an opportunity to kill them. On most soils it is necessary to destroy weeds in this manner quite a number of times before it is anything like clean.

Weeds in roadways, gravel paths, and the like, may be exterminated quickly and economically by means of Herbicide, a chemical which will destroy all vegetation upon which it is poured.

Weeds in existing turf present some problems, and their eradication may be considered under the following headings:

Weeding by the Application of Chemicals Broadcast

This method is based on the principle that many substances have a caustic effect on the leaf of the plant, but when scattered on the soil around them will do no harm. Many weeds, particularly those with broad, flat, or hairy leaves, and more especially those with weak fibrous root systems, may be eradicated by this treatment. Climax Lawn Sand is scattered on the turf at the rate of four ounces per square yard where weeds are thick; and, where the weeds are not so numerous, a small quantity may be placed on the center or crown of each weed. The shape of the grass leaves permits the Lawn Sand to fall down on to the soil between them and they are not harmed—rather, they are benefited, for the Lawn Sand is in fact a highly concentrated grass fertilizer. The broad, hairy, or flat leaves of most weeds, however, hold and retain the chemical and this burns the leaves. Those weeds which have rather weak root systems are killed when their leaves are destroyed, and in this class may be placed the following:

Veronica, or Speedwell
Chickweed
Young Dandelions

Mouse-Ear
Young Plantains
Moss

Weeding by the Spraying of Chemicals

This method is used by the farmer to destroy charlock or mustard from his wheat, barley, or rye (which are in reality large grasses). Thirty pounds of sulphate of copper are dissolved in 100 gallons of water, and the solution is sprayed on to the whole crop. A very fine mist has to be produced with a spraying machine, and it has to be applied so as to wet thoroughly all the leaves and stems of all the weeds. The grass will be unharmed but many of the seedling weeds will be destroyed. Fifty gallons of the solution would be sufficient for an acre, and it should be used when young grass is about 2 inches high and before the first cutting. This

method is not suitable for putting-greens, but it may at times be useful for newly sown fairways on land that is not clean. Annual weeds and seedlings generally may be expected to be destroyed by this method.

Hand Weeding

To remove weeds from established putting-greens, it is advisable to resort to hand-weeding. Crabgrass and other weeds appear at a time when the schools are on vacation and it is frequently possible to employ boy-labor on this work. We suggest that a putting-green be cleared as follows:

(a) Obtain two lengths of cord as long as one side of the green and with a peg attached to each end. Stretch one of these cords along one edge of the green, and place the other on the green parallel to the first cord and 3 feet from it. Thus, a strip a yard wide is marked off ready to be cleared.

(b) Set a boy at work to remove every weed from this alleyway. Equip him with a special Chisel Knife, as offered on page 30. Small weeds he removes by inserting the knife close to the weed, grasping the weed with his thumb, and pulling knife and weed out together. Large weeds are removed by inserting the knife about 3 inches away from the weed and about 3 inches deep: pressure on the knife will then cause the soil to crack, when the weed may be lifted out.

(c) Provide a second boy with a pailful of dry, screened compost or clean soil, mixed with 5 pounds of grass seeds. Instruct him to follow his partner and fill each hole with the mixture, pressing down with his foot.

(d) Inspect the cleared alley.

(e) Remove the outer cord and place it parallel to the second cord, but 3 feet nearer the center of the green. Set the boys at work on the second alleyway thus formed.

(f) If weather is hot and dry, let the sprinkler run at gentle pressure for a short time after the green is freed of weeds.

Combined Hand-Weeding and Chemical Applications

Take a jar of sulphuric acid (commercial strength), and a number of thin "slivers" of hard wood. Place the jar in front of you and dip a sliver into the acid and then jab it into the center of the weed. Continue this until every weed within reach has been treated: move along and treat the next area until the whole green has been treated.

It is possible to procure contrivances which will "sting" the weeds by automatically injecting a liquid or solid poison on to them, and they are effective and quick.

Killing weeds in this way is cheaper than hand-weeding, but we find the dead weed causes a bare patch which takes some little time to heal, whereas with the hand-weeding process the weed is removed, pure grass seeds are put in its place, and in a few days the turf heals.

Moss

Turf that is thin and which shows, instead of grass, occasional patches of moss, is frequently met with on almost every golf-course. It is due, generally, to one of two causes: either the soil is waterlogged and sour in consequence, or the soil is so deficient in plant-food that it cannot support grass.

If there is no doubt as to which is the cause, attempts should be made to remove it; but if there is a doubt, it is well to assume at first that poverty of soil is the trouble, because it generally is so, and because a process of renovation is much less expensive than a drainage job, and is always beneficial.

Turf Versus Seed

Occasionally a club is offered a supply of turf that has been lifted to give place to building operations, and the temptation to purchase and use it is great. We have in mind a certain committee that was much impressed with about two acres of fine lawn which was velvet-like in texture: they purchased it at a fancy price, lifted it, and laid it with every care. Their greens looked wonderful for a few days, when they started to go back: their deterioration was continued to such a point that they finally decided to dig in the remains of their turf and sow seed.

The usual experience is that newly sodded ground never afterward looks so well as it looked on the day it was laid. The chances are in favor of the sod having been produced on very different soil to that of the course, and, in consequence, the varieties of grass which comprise it are those which will not succeed in their new surroundings. Our suggestion to a club is, therefore, never to purchase sod from outside for construction or repair work.

Another question absolutely is the occasional entire removal of a green from one point to another close at hand: to use the fine sod from the old green is generally quite the best procedure.

The production of sod on your own course, however, for occasional repairs is also another matter, and we strongly urge upon green committees the advisability of always possessing a turf nursery, where a tract of grass is made with as much care and thought, as a new putting-green, and the turf rolled, mown, top-dressed and otherwise tended as any of the greens. Such an area could well be utilized in many cases by the professional for instruction, or as a practice-green. When sod is needed for the repair of greens and tees, a supply is thus available consisting of just those varieties that are natural to your course, and patching can thus be undertaken or even new greens constructed with the material right at hand.

On many courses the greens can be classed under two headings: those on high and dry ground, and those on a more moist foundation. In such a case two areas of nursery turf should be cultivated, one on high ground and the other in a low situation.

We find that an ordinary hole-cutter is very useful for slight repairs. A few discs can be taken out of a green from the center of clover patches, say, or from worn or weedy

spots, and immediately similar discs of fine turf can be transferred into their places from the turf nursery.

For larger repairs, the cutting into squares 1 by 1 foot is the best, while for construction work the use of a horse turf-cutter, as listed on page 30, will very quickly more than repay its cost.

Laying Turf

When transplanting sod for repairs or for construction work, the following should be carried in mind:

The turf should be of uniform thickness.

The turf should be taken from a situation exactly similar as regards moisture, aspect, shade, and soil to that on which it is to be laid.

The land should be prepared with thoroughness.

The turf should occupy the minimum amount of time between its lifting and relaying.

The turf should be "tamped" firmly onto its new bed.

The turf should be "cemented" into place by rubbing into all cracks and crevices a mixture of soil, compost, or rotted manure and seed.

Plenty of water should be given after sodding.

The months of June, July, and August should be avoided for this work if possible.

Two inches of soil and grass roots is a good thickness to which to cut turf, and a good idea is to aim to lift them a trifle thicker than this, and to prepare a wooden tray of a size exactly to hold the sods: nail walls on to three sides of this tray exactly 2 inches high inside measurement. Prior to setting the sods, place each one in the tray, grass side downwards, and shave off excess soil and roots by means of a scythe blade, resting each end of the blade on the sides of the tray when cutting: draw the blade toward you, and arrange the tray on a suitable stand with the fourth or open side away from you.

Prepare the soil just as carefully, although perhaps not quite so deeply, as for sowing seed. At least a 2-inch layer of top-soil should be added, and to this five loads per green of spent mushroom soil or rotted manure may be added, and the whole worked together. Dust on each green 150 pounds of Emerald Grass Fertilizer, and rake with a view to distributing this fertilizer and to prepare finally the land for the reception of the sods. Do not walk unnecessarily upon the newly sodded area, and it is a good plan to lay planks upon which to carry or wheel materials.

Vegetative Greens

Those clubs which have had the benefit of the advice and the personal care of the experts of the Department of Agriculture at Washington have been able to make, under their guidance, some greens consisting entirely of Carpet Bent, taking advantage of the property of this grass of producing runners, which trail along or just under the surface of the soil and produce roots and growing shoots at intervals of an inch or so along these runners. The process is very simple:

A supply of the runners, or "stolons" to be more correct, is obtained, and they are cut up in a hay-cutter into lengths about an inch long, broadcasted carefully onto the prepared soil of a new putting-green, and lightly covered in the same

way as seed. The result is that a green is obtainable in almost as short a time as is possible with seed, of absolute uniformity, and consisting entirely of pure Carpet Bent. Such greens are very satisfactory. The same very careful preparation of the soil as for seed is necessary, and it is just as essential that the land, after its final preparation, be kept as long as possible before seeding, to permit weed seeds to germinate and be destroyed with rakes and hoes. The nature of Carpet Bent is such, however, that its very character, matting and intertwining one with another, as the plants do, is such as to prevent, very largely, the development of weeds once it has taken hold, and assuming that the

soil and surroundings are favorable to the growth of Carpet Bent.

A very excellent method of combining the two methods of seeding and vegetative reproduction is to prepare a turf nursery as suggested on page 15, but to seed it very differently from the ordinary established practice.

Prepare the soil very carefully, ascertaining that there is a layer at least 4 inches thick of good top-soil. To this add spent mushroom soil or rotted stable manure at the rate of 10 pounds per square yard, work thoroughly, and rake to a fine surface. Now sow seeds of genuine Creeping Bent in drills 20 inches apart, just as a market-gardener would sow his spinach or carrots, and when the young plants appear above ground they should be watched and weeded frequently. Occasional dressings of Emerald Grass Fertilizer should be given from time to time to the soil between the rows, and this soil should be hoed every ten days to kill any weed seeds that may develop into young plants. After a month or so the grass will thicken and the space between the rows will grow smaller and smaller until the plants from one row will meet and knit with those from another; at the end of a further period, the Creeping Bent turf will be ready to lift, although the longer it is kept between the final knitting and the lifting the better will be the result. At the outset the grass should be kept mown to a height of 2 inches, and frequently rolled along the rows, both of which will encourage the formation of the creeping runners; toward the end, after

the rows have knit, the mowing-machine may gradually be lowered until it cuts the grass to a 1-inch length.

The Carpet Bent runners furnished by Washington are generally the cultivations of different strains which have been located from time to time, and these strains vary considerably in their resistance to disease and seashore conditions and in their color. On the whole, the vegetative greens that we have seen are a trifle disappointing as to color, and they are a little coarser than we would have expected after the great care that obviously has been given them. The Creeping Bent that would be obtained from seed would consist of a mixture of strains, some more resistant to conditions than perhaps the Washington strains—some less; some more pleasing as to color and texture—some less. The production of turf vegetatively is very old in principle, but its practice on a golf course is strictly modern. It is really in its experimental stage: we do not think it will displace the formation of turf from seed, because by far the finer greens we have seen are produced from seed, but they have had the further advantage of attention running over a period of years, which the Washington greens have not. That the method has some advantages is obvious, and we can see, or think we can see, some advantages of the seed-vegetative method mentioned above over the strict vegetative process.

For seeding large areas in drills in the way outlined, the Planet Junior machine which is described on page 34 would be found a labor-saver.

Mowing

We doubt if there is a more expensive item in the upkeep of a golf course than mowing. During the spring and fall, on a course in good condition, it is frequently found necessary to cut the greens daily; on others every two days is the rule. Close cutting tends to the production of "fast" greens, while a longer growth of grass slows the ball considerably.

We suggest that the greens be cut quite closely during the cooler months of the year, but, during June, July, and the first part of August, it is a good plan to let the grass lengthen somewhat and so do something to avoid the burning that so frequently occurs.

The question as to whether the cuttings should or should not be left on the turf is a much-discussed one. We lean to the side that machines should be furnished with catchers, and the clippings removed every time. It is true that to leave them on the greens is to return to the soil something of what the plant has taken out of it, but a long process of decay has to take place before the small amount of nitrogen and other plant elements that are in the leaves will be in a fit state for the plant to again take advantage of them, and this decomposition can best be carried on in the compost heap which is referred to on page 21.

Newly sown grass on the putting-greens should be clipped with a well-adjusted machine as soon as it is 2 inches high, while that on the fairways should be cut when it is 3 inches high. Later the machines may be gradually adjusted down until the grass is cut to the length preferred by the members and professional.

Cutting grass has much the same effect as pruning has to a tree. It induces the production of fresh shoots or twigs,

and the more grass is cut the more it "tillers" in this way, until the newly sown grass ceases to be a collection of individual plants and becomes a tough matted mass, hard wearing, pleasing to the eye, and a joy to every player.

It is poor economy to purchase cheap mowing-machines. A high-grade, ball-bearing mower outlasts by many times the cheaper outfit: its adjustments are more easily made and are more easily maintained: a slight misadjustment will pull out grass plants in the same way as a hair-clipper in the hands of a careless barber will tug one's hair. The higher grade machines look expensive as compared with average machines, but so does a high-grade automobile as compared with the popular makes, and, like the automobiles, a difference in price is warranted. A putting-green is, or should be, the acme of perfection in fine turf, and to obtain it the highest grade up-to-date tools are necessary.

Of horse-machines, the Townsend Triplex is, in our opinion, the best in every way. It cuts a large swath, and its construction enables it to conform to every undulation on the course. It is superfluous to add that, to date, hand machines are used invariably on putting-greens, horse- and motor-mowers being suitable only for the fairways.

Of motor-mowers it is difficult to make a recommendation. All the advertised makes are efficient and economical in operation, but the Worthington Tractor in combination with the Shawnee Triple Mower appears to us to be the best yet.

The Ideal machines listed on page 38 are also good. They are of such simple construction that a break-down means nothing more than the quick supply of some inexpensive spare part.

Rolling

Generally speaking, very light land may be heavily rolled with impunity at any time, except when wet. Heavy soils may be rolled with a light roller occasionally; also only when the soil is dry. The question as to what is a light and what is a heavy roller is a matter of experience to decide. Taking a mower which rolls a path 5 feet wide, anything like 1,000 pounds would be light; anything beyond 2,000 pounds would be heavy. In hand-rollers, taking as an example one that

is 2 feet wide, 100 pounds would be light and 400 pounds would be heavy. Within these limits, the green committee can readily determine the kind of roller best suited for their greens. In addition to rollers of this type, a putting-green is much helped by passing over the surface a very light wooden roller. The work this does is entirely confined to the grass and to the barest surface of the soil. The land itself remains open and porous.

Winter-kill

On almost every northern golf course, in the spring when growth has commenced, bare patches here and there will appear. On some courses there are not many of them; on others, the total bare area is quite large. Happy is the greenkeeper who has a course which does not suffer materially from winter-kill. From our experience, we find that the chief cause of these bare patches is the collecting, in depressions and poackets of the turf, rainwater or water from melting snow. The condition of the soil does not allow this water quickly to get away, and a drop in the temperature converts it into solid ice. This cake of ice, in the late winter,

freezes hard at night and partly melts during the daytime, and it is this freezing and thawing at the end of the winter which is the cause of most winter-kill. The only radical cure is a system of drainage, so altering the configuration of the greens, that surface water readily drains away or by insuring with under-drainage that all excess moisture disappears the moment it collects. The usual spring treatment of these winter-kill patches is to rake thoroughly the soil, add a 1-inch layer of compost, again rake, then sow a small quantity of seed. The amount of seed required is usually figured at the rate of 2 ounces per square yard of bare land.

Shaded Greens

Shaded greens are generally the most picturesque on the course, but they frequently are the source of more worry to the greenkeeper than all the other greens combined. It is a good plan if special care be taken in the initial construction to seeing that the green is tile drained; we recommend that this be done in every instance where the green is to be constructed in a shady location. Next in the construction work see that the green is so graded that all surface water is led away quickly.

In these greens, above all others, a well-prepared top-soil is necessary, consisting at least of the top 4 inches spe-

cially made up of 30 per cent sharp sand and 70 per cent good top-soil, with a ton of charcoal worked into the surface. A quantity of these materials should be passed through a quarter-inch screen to make the final surface, and the green should be sown with a mixture of seeds in which Creeping Bent, Chewing's Red Fescue, and Rough-stalked Meadow Grass are used in equal proportions. We can supply such a mixture at \$1.25 per pound.

The after-care of a shaded green should include top-dressings several times during the playing season, such top-dressings consisting of sand, charcoal, and fertilizer.

The Effect of Heat and Drought

Some courses look very good in the spring, early summer, and fall. The turf is frequently a dense mat, free from weeds and perfect in every respect, but when the really hot days of July come, the grass burns and becomes very unsightly.

This often is due to exceptional conditions of soil and a somewhat artificial turf, in that varieties may have been sown which are not suitable to excessively dry conditions; but the fact that the greens are very carefully taken care of enables the grass to survive during ordinary periods, and it is only when a period of drought arrives that the unsuitable varieties do not flourish but their leaves dry and turn color. The cure for this should be along the lines of *adjusting the seed to the soil* and *adjusting the soil to the turf*. The sowing of additional seed at least once a year, fall preferred, consisting of a mixture such as the following, would be advisable:

30% Fine-leaved Sheep's Fescue	15% Various-leaved Fescue
40% Red Fescue	15% Rough-stalked Meadow

Such a mixture should give good results on the greens,

when added to grass already there, and it is generally required in sufficiently small quantities that it may be used both on fairways and greens. Thirty to fifty pounds per acre on fairways, and thirty pounds per green of this mixture should afford satisfactory results. We carry this mixture always in stock and we offer it on page 7.

Under the heading of adjusting the soil to the turf, it would be a good plan to top-dress the greens every spring and fall with a $\frac{1}{2}$ -inch layer of a compost made up as follows:

50% good clean loam	50% commercial humus
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Thoroughly rotted mushroom soil, compost, or absolutely decayed horse- or cow-manure may be substituted for the humus. This mixture, after being spread on the greens, should be well distributed and rubbed into the soil by using rakes held the reverse way (that is, using the back of the rake). The fairways, also, on such a soil might well be given a dressing every fall, consisting of spent mushroom soil or thoroughly well-rotted manure, either of which might be figured out at the rate of 20 tons per acre.

A Few Notes on Soils

Most varieties of grass are "comfortable," and will give the most permanent success, from a golfing point of view, when they are grown on soil of a *medium* texture. This word is frequently mentioned in connection with agriculture, but its meaning to some may be a little obscure. We all know a clay soil: one which sticks to one's shoes when wet, and becomes of the nature of concrete when dry, and, we are all familiar with a truly sandy soil, one through which rain will quickly disappear, and which, when dry, will sift easily through the fingers when held in the hand. Midway between these two extremes is found a *medium loam*, and if it errs a little on the sandy side, we call it a *sandy loam*; if it contains more clay than sand, we call it a *clay loam*. Soils which contain a preponderance of clay—*clay loams*—are also termed *heavy soils*. Those which contain a large quantity of sand—*sandy loams*—are known as *light soils*.

During the course of years, plants have grown and have died on the soil in question. Animal life of all kinds, too, has existed there, and these remains, vegetable and animal, contribute another ingredient to the top 9 inches or so of soil. These remains, in a decayed form, are known as humus, and where they are very much in evidence, and when they form a major part of the soil, the soil is termed "*muck land*."

A medium loam is the best land for a golf course. A sandy soil can very quickly be brought into shape; heavy land is very difficult to handle, however, and muck

land is almost impossible, from a golfing point of view.

We have considered the mechanical texture of the soil; something of the chemical condition must be thought of. Grass plants need lime, nitrogen, phosphoric acid, and potash, as their most important foods; and because grass is such a shallow-rooting plant, they further need these in sufficient quantity in the top 4 inches of the land. Ordinary soil, which has carried crops of good quality previously, quite frequently has sufficient of these elements. You will note that we say one which has previously carried a crop of good quality.

In preparing land for grass, one of the most frequent sources of error is to plow or to dig the land so deeply that the top-soil is placed at too great a depth and some of the subsoil, that is to say, the layer next under the top-soil, has been brought to the surface, covering the true growable soil. Subsoil is very frequently deficient in humus and also in plant-foods, and by thus cultivating too deeply it is possible to commence the construction of the course with the handicap of a poor, worthless soil, while a good growing soil has been buried a few inches below the surface. Look at a grass plant and you will notice that it is very exceptional for the roots to penetrate more than 4 inches into the soil. It is thus obvious that good soil, buried to a greater depth than 4 inches, is absolutely lost to the grass. In the construction of both greens and fairways the conservation of the top soil is thus a matter of the fullest importance.

Drainage

Land that is soft and soggy at times, when other portions of the course are dry; land which, on test, invariably gives an acid reaction; land on which sedges, rushes or wild iris are found luxuriating—all such land needs tile-draining.

Pipe- or tile-drainage is simple, provided care is taken to see that all the pipes that are laid have a steady and gradual fall to their outlet. A main trench should be dug, running from the affected area by the shortest route to a ditch, river, water-hazard, or trap. Radiating from this, further ditches should be dug in the affected area. These ditches should be as straight as possible, and the branch should not meet the main trenches at right angles, but preferably at an angle of 45 degrees, to ensure an even flow of water. Branch ditches should join the main ditch separately; in other words, the branch on the right and the branch on the left should meet the main ditch at different points. In the main ditch a row of 4- or 6-inch drain-tiles (the size refers to the diameter of the pipe) should be placed. They should be closely laid, end to end, but no attempt is to be made to cement the joints. It is largely through the open joints that the water enters the pipe from the surrounding soil. In addition to water entering the pipe at the joints, there is also a gradual seepage from the side through the porous walls of the pipe. For the branch ditches, drain-tiles 3 or 4 inches in diameter are usually used, and these should be similarly laid, end to end, accurately but with no attempt at joining. Where the branches meet the main drain, it is sufficient that the main drain be continuous, and that the side pipes just butt against the main line of pipe. It is not usual to have tiles of a "Y" shape to accommodate the branches, although it can be readily

understood that the drain would be a little more efficient if they were used. A commencing depth of 18 inches under the surface for the branch drains is usual, and a steady fall in the system determines the depth of the other pipes. After being laid in the bottom of the trenches, it is a good plan to at first put a layer of stones on top of the pipes, then return the subsoil, and finally the top-soil.

A screen of wire netting over the outlet for the drain is necessary to prevent moles, rabbits, rats, field-mice and woodchucks from entering the tiles and choking the system.

Where an outlet, as suggested above, is not available, it is sometime possible to dig a large well or tank into which the drainage pipes may be run, and which, when all the tiles are laid, may be filled with rocks, building rubble, and clinkers. Sometimes the land is so wet that even this cannot be dug without it continually filling with water. In this case, there is nothing to do but devise some mechanical means whereby the water from such a well could be siphoned out.

In many cases the disposal of surface water is alone sufficient to clean a stagnant piece of land, in which case a series of wide, shallow depressions may be run, with a gradual fall, to an outlet, making the work more of a grading job than one of trench-digging. Further, a wet, soggy depressed patch may frequently be corrected by dumping a few loads of earth upon it, turning it into a slight hillock instead of a depression.

Where situations exist that show drainage problems, it would be a good plan for the designer of the course to so arrange his plans that such water-logged soil be turned into a very interesting trap or water-hazard.

Are Fertilizers Necessary?

This question is often asked when a new course is being laid out. If your soil has previously been farm-land, if it is of medium texture, and if it has previously carried good crops, it would probably be false economy to add fertilizer to fairways, but these conditions so rarely rule that the addition of some plant-food is generally required. If the soil is heavy or if the soil is light, it will generally benefit mechanically with the addition of decayed vegetable matter or humus. This may be added in one of the following three ways:

- (a) Farmyard or stable manure may be applied.
- (b) If time permits, a green crop may be sown, and when

the plants have grown to a suitable size, the land may be dug or plowed, turning the plants under the land, where they will decompose.

(c) A quantity of commercial humus may be applied.

The above refers to fairways. *It always pays to add fertilizer to the soil of new greens.* As we see it, the way to build a putting-green is to use as thick a layer as possible of good top-soil. In the top 4 inches, incorporate mushroom soil (or sand, if the top-soil is unusually mucky) and *add a layer of screened soil and chemical fertilizer over all.* In this sow suitable seeds. From 100 to 200 pounds of chemical fertilizer per green is usually used.

The Manure Problem

Time was when the farmer, bringing his produce to market, would, for a consideration, remove and dump on his land the horse-manure accumulated by the city horse-owner. Later he was glad to remove it without cost, and now, with horses becoming fewer and fewer, manure is mounting higher and higher in value. Few good farmers can be induced to sell manure, and the club is usually forced to go farther and farther away for its supplies. With the disappearance of the horse, and with increasingly efficient methods of garbage destruction in cities, there is a possibility that the supply of manure may cease altogether for all practical purposes.

We are still in a position to quote on car lots of Horse-Manure. For limited areas, Pulverized Sheep-Manure is a satisfactory substitute for rotted stable-manure. In this case the droppings of sheep in the stockyards are collected, subjected to sufficient heat to drive off moisture and to kill weed seeds, and the material is then practically in a powdered form. This, after it has been applied, very quickly reabsorbs moisture, and its bulk is thereby increased.

Shredded Cattle-Manure is a highly concentrated animal manure which is also of value in this way, but artificial fertilizers will not take the place that animal manure occupies in green-keeping; chemical and desiccated animal manures are a splendid adjunct, but are in no sense a complete substitute.

The real solution to the manure famine, however, is very simple: it is no less than, *with the aid of fertilizers*, to grow a bumper crop of some bulky material and, with the addition of some more fertilizer, to plow it under the soil where it will speedily decay. Such a process increases, enormously the vegetable matter in the soil, improves its texture, and increases its water-holding capacity; it adds and retains valuable plant-foods; it helps to clear land of weeds; and it solves the manure problem.

There are a number of plants which lend themselves to this purpose in that they are quick-growing and bulky and their seeds are inexpensive. Generally, it is best to select some one of the legumes because all plants of this family (peas, beans, clover, etc.) have the well-known property of absorbing the free nitrogen which is in the air around us, and, with the aid of bacteria, converting this nitrogen into nitrates. Thus, a plowed-in crop not only adds considerable bulk of vegetable matter to the land but it actually increases its fertility through the additional nitrates which are added

to the soil. Note that this work is performed with the aid of soil bacteria, which are usually in the soil in sufficient numbers to do the work quickly; in the event that they are not, it is always a safe insurance to *inoculate the seed* of all legumes before sowing with the necessary nitrogen-fixing bacteria. (We offer at foot of this page suitable cultures of these bacteria under the trade name of "Bactrelo.")

Having inoculated the seed and prepared the land for seeding, we recommend that some chemical fertilizer be applied, such as acid phosphate, bone meal, or the like. (See the table following the next page.) Then scatter the seeds broadcast at the rates indicated on page 6, harrow in lightly, and roll. A good time to plow is just before the land is wanted for seeding to grass, unless the land is foul with weed seeds, when a period during which the land may lay fallow is desirable; but in any case, it would be a good plan not to allow the crops to reach such a degree of maturity that they seed; if it is still too early for grass seed, plow in the cover-crop when it is in flower and before it has ripened its seeds. In plowing, let the furrow be as shallow as possible consistent with completely inverting the sod. Attach chains to the plow if it is found necessary.

After plowing, a dressing of our Fairgreen Fertilizer may be given at the rate of 750 pounds per acre, the land then harrowed and sown down with grass seeds. Cover the grass seeds by means of a bush harrow lightly drawn over the land, and roll.

We suggest that when constructing a golf course, or undertaking any other agri-horticultural proposition it is a good plan not to allow even the smallest amount of land to remain idle. It is an excellent idea to allow a cover-crop to stand over the winter, say rye or wheat or winter vetch, or, better still, a combination of all three.

Bactrelo

Supplies the nitrogen-fixing bacteria necessary for the successful growth of Beans, Peas, Field Peas, Alfalfa, Sweet Clover, Red Clover, Mammoth Clover, Crimson Clover, Alsike Clover, Vetch, Soy Beans, Cowpeas, Field Beans, Field Peas; also Mixed Garden crops. Separate cultures are offered for each of the above; state for which crop required.

Garden size.....	\$0 50	|	3-acre size.....	\$2 50
1-acre size.....	1 00	|	12-acre size.....	9 00

Charges prepaid

A Simple Method of Testing a Soil for Lime

Soil that has not carried a crop for some years, or in which a very high proportion of vegetable matter exists, will frequently show an acid condition. This is due to the fact that, when vegetable matter decomposes, one of the results of decomposition is the formation of a quantity of humic acid. Very few grass plants thrive in soil which is highly acid. Most grasses succeed best in land which is only slightly so, and it is frequently necessary to correct a highly acid condition. The most usual method of correcting acidity in soil is to add lime.

Although lime is decidedly a plant-food, an excess of it is injurious, and it is very undesirable to apply lime to land which already has a sufficiency of it. It is always to be recommended, therefore, that the following experiment be used to determine whether lime is needed or not. Obtain two watch-glasses or crystals and from a drug store a supply of both blue litmus paper and red litmus paper. Take a small strip of the blue and place it in the bottom of one of the watch crystals; take a piece of red, and place it in the bottom of the other crystal. Now take a handful of the soil to be tested, which must be in a moist condition, and place it in one of the watch-glasses, covering the litmus paper. Take the other watch-glass with the litmus paper in position, and place it on top of the soil. Press the glasses together quite tightly and bind them with an elastic band. Leave for an hour, by which time one of three things will have happened. Should the red litmus paper have turned bluish you may conclude that your soil already has enough or even too much lime. If your blue litmus paper has turned red, your soil is evidently acid, and will benefit by an appli-

cation of lime. If neither the red nor the blue paper has changed color, your soil is neither extremely acid nor extremely alkaline, and under such conditions it is generally desirable not to apply lime.

Other pointers that suggest acid conditions and a consequent need for lime would be:

(a) The presence of sedges, rushes, sorrels, or wild iris shows lack of drainage, with consequent probable acidity. In this case, drainage is probably needed badly.

(b) Patches of moss indicate either acidity or poverty of soil: that is, a lack of the foods needed by grass. It is a good thing to correct for both possible causes by dressing with lime and then adding compost or manures and a chemical fertilizer.

(c) Sour land, needing lime, has a disagreeable smell that is readily recognized by greenkeepers.

(d) Land that lies low, land which has recently been cleared of trees and brush, or land that is excessively wormy—all these usually are signals that lime is advisable. All the above, too, if excessive, indicate that drainage should be considered also.

A note of warning. Do not add lime to putting-greens until the question has been well considered, because the effect of a dressing of lime is very often to increase the size of white clover plants already there, and in some cases to stimulate into growth seeds of white clover which ordinarily would remain dormant in the soil. Under these conditions, a partial substitute for lime would be charcoal: a dressing of this sweetens the soil but has little effect, one way or another, on clover.

Is It Necessary to Test a Soil for Other Elements Than Lime?

Of other plant-foods needed by grass, the three most important are: nitrogen, phosphoric acid, and potash. An analysis of soil will almost invariably show that these three are present in sufficient quantity to support grass. But an analysis will not tell you how much of these may be ready at the plants' immediate disposal, and how much is locked up for future generations of plants to use. These elements, although widely present in soils, are generally in a state in which the plant cannot use all of them at once. The decomposition, which alone time can effect, is necessary gradually to release these elements for the use of plants. As, therefore, a chemical analysis does not tell you fully what small proportion of the elements in question are immediately available, and as, if it did, such proportion would be very small, it is generally desirable to proceed along the following rules. In sowing down a new course, if the land has previously carried good crops, it will generally not be economy to add further quantities of nitrogen or phosphoric acid, but if it has lain waste for some years, it is always desirable to add a chemical fertilizer containing both nitrogen and phosphoric acid. In existing turf, in view of the fact that the greens are being cut, which is another way of saying the greens are being cropped regularly every day or two during the summer, it is always a good rule to return to the land approximately as much phosphoric acid and nitrogen as the

grass clippings may be expected to have removed together with the quantity of these elements that may have seeped away in the drainage water. In other words, in sowing down new land, the addition of these two elements is generally desirable, and in the treatment of existing turf, their addition is almost always desirable. It is fortunate that grass plants need very little potash, and there is generally sufficient in the soil to take care of their requirements; it is usually quite unnecessary to add it in the form of commercial fertilizer.

The commercial fertilizers are always sold on a basis of analysis, and the somewhat cryptic array of figures, generally three, represent ammonia (containing nitrogen), phosphoric acid, and potash.

In practice it is found that phosphoric acid is the one element that is most frequently lacking, and is the one most needed by young grass; and an economical and desirable fertilizer would have an analysis of 0-15-0, which would mean: no ammonia—that is, no nitrogen—fifteen per cent phosphoric acid and no potash. It will be understood that in the case of newly sown fairways the necessary quantity of nitrogen will have been added by the cover-crop. We offer a material that we consider an ideal dressing for fairways in our "Fairgreen Fertilizer," and the cost, approximating only about \$25 per acre, is such as to warrant its being used in quantity.

The Compost Heap

Practice extended over a number of years indicates that good turf is the result of constant, unremitting care as much as of initial selection of soil and seed. In other words, turf has to be "nursed" along all the time, and the most effective way to care for it is to scatter broadcast materials which feed or protect the grass. These materials consist essentially of two ingredients:

1. A plant-food, yielding some one or another of the elements required by grass, chief being ammonia, phosphoric acid, potash and lime, mixed carefully with:

2. A "filler" or base which serves the primary purpose of distributing evenly the above-mentioned food and which secondarily may be of value by adding further quantities of plant-food, and, what is more important, may be used to improve the mechanical condition of the land.

Such a mixture we call "compost." Land to grow grass must not be too light or too heavy, too porous or too sticky; must not contain too much vegetable matter, nor must it contain too little. It should, in short, be as near as possible to a medium sandy loam, and, in deciding on a "filler" or base, that one should be chosen which will have a tendency to correct and bring to the happy desired mean the soil of the greens.

The filler may be obtained as wanted, and the grass foods or fertilizers may be purchased from time to time, but there are many advantages to be derived by procuring these ahead of time and storing them. They are stored in a "compost heap."

A compost heap is the greatest producer of fine grass, and every course should possess one. It is a storehouse of soil-building material, the use of which tends to make the land mechanically and chemically perfect, and with it greens and tees are periodically top-dressed. Compost improves with age—the more decayed it is, the more valuable it is.

All grass will benefit with an application of compost, but especially turf which is thin and poor or coarse, and which covers soil which is (1) excessively light, (2) excessively heavy, or (3) which contains an excess of decayed vegetable matter. Grass does not like an over-abundance of any one ingredient in the soil, and, by means of top-dressings, it is possible eventually to correct such a condition so far as the uppermost layer of the soil is concerned.

As to when top-dressings should be given, we advise a comparatively heavy dressing of compost before winter, say 3 or more cubic yards per green; a medium-heavy dressing, say 1 or 2 cubic yards per green in early spring; and a very light dressing, say 3 or 4 wheelbarrow loads per green, every three or four weeks during the playing season. This latter quantity is so small that play is not interfered with.

What is an ideal compost for top-dressing depends upon the soil upon which the greens are built. For land that is light (1), we advise a mixture of good top-soil, mushroom soil, and Emerald Grass Fertilizer.

For land that is medium or heavy (2), we recommend a mixture of coarse sharp sand, mushroom soil, Emerald Grass Fertilizer and hydrated lime.

In constructing the storage-pile, mushroom soil should be spread in a layer 4 inches thick, the top-soil or sand 3 inches thick spread over it. Continue with alternate layers

of Mushroom Soil (4 inches) and top-soil or sand (3 inches) until the pile reaches a height of 4 or 5 feet. On the top of each layer of soil add a little Emerald Grass Fertilizer, and for heavy land on each layer of Mushroom Soil dust a very small quantity of hydrated lime.

For land that has an over-abundance of vegetable matter in its composition (3), use sand only, or a mixture of sand and top-soil, with Emerald Grass Fertilizer. Care has to be taken in selecting your top-soil, because it frequently contains weed seeds.

A compost heap cannot be too large. Although a top-dressing may with every advantage be given immediately the heap is made, the longer the compost is kept, the more valuable it will be. Sufficient to last several years is not too much. An average eighteen-hole course will consume a minimum of 100 tons (3 carloads) of Mushroom Soil, and 60 cubic yards of coarse, sharp sand every year for top-dressing and other work. It is a good plan to make one's heap long and narrow, say 10 feet wide, 6 feet high, and as long as necessary.

This heap of layers of sand or top-soil, and manurial matter should preferably be in a pyramid shape, as this will shed rain, but it is far better for the club to realize that every rainstorm is robbing their manure of some of its value and to *provide a roof* over the compost heap so that the fertilizing materials will be conserved.

There is no special apparatus required for applying top-dressing. It is readily broadcasted by means of shovels or by hand, and where, by accident, a little may have been deposited somewhat too thickly, it may be evenly distributed with the aid of birch brooms or rakes. When taking compost from the heap, use care to spade through in a vertical manner, thus obtaining a complete mixture, and *throw the material through a screen before applying*. When the compost heap has been newly made, this screen will generally be of half-inch mesh, but as the heap gets older and decay becomes more complete, a screen with a quarter-inch mesh may be used. All material which refuses to pass through the screens may be returned to the compost heap to decay further.

There are other uses to which we may put compost. In any construction work, particularly new greens or tees, a layer of compost is invaluable to form a seed-bed. In sodding, the soil on to which the sods are to be laid can well be mixed with a little compost to ensure their "taking," and, after laying, they may be cemented together by sprinkling over them, between the cracks, some of the above-mentioned compost, to which a few pounds of suitable grass seeds have been added.

After weeding, if a little sifted compost is mixed with seed and the holes filled with it, the greens immediately recover. Bare patches that have been caused by wear, grub attacks, and other causes, may be quickly repaired with some of this seed and compost mixture. When planting trees, when seeding bunkers, and when conducting many other of the operations around a golf-course, a supply of compost is invaluable. The purchase of materials for the compost heap may be regarded as an investment which continually increases in value.

Materials for the Compost Pile

(SEE, ALSO, PAGES 20 AND 21)

MUSHROOM SOIL, in cars containing from 30 to 40 tons, \$5 per ton, f. o. b. Pennsylvania shipping point. Through freight rate to your station gladly quoted on request. Mushroom Soil is partly decayed horse-manure, which has grown a crop of mushrooms. Only pure droppings from healthy animals will produce mushrooms; hence Mushroom Soil is a particularly desirable type of manure. It is highly concentrated, and in comparing its cost with that of fresh stable manure, it may be assumed that one ton of Mushroom Soil is equal in value to at least two tons of fresh manure.

HUMUS, in cars containing from 30 to 40 tons, \$8 per ton, f. o. b. New Jersey shipping point. Special quotations on request for less than car. Humus is decayed vegetable matter that has accumulated for centuries

in swamps and woodlands. It is occasionally preferred by green-keepers for top-dressing.

EMERALD GRASS FERTILIZER, \$70 per ton, f. o. b. New York City. A carefully blended mixture of chemical fertilizers, designed for the production of fine turf.

HYDRATED LIME, in bags, \$30 per ton, f. o. b. New York City. Three tons or over, \$27 per ton. Special quotation on request for carload lots.

Garbage Disposal

The most satisfactory method of disposing of waste material from the club house is to construct an incinerator. The burned material, in the form of fine dust, forms a splendid addition to the compost heap.

S. & W. Co.'s Special Grass Fertilizers

S. & W. Co.'s Emerald Grass Fertilizer. For putting-greens and tees. A well-balanced formula designed to feed the finer grasses only and to keep them in best condition. It will not burn the grass if applied with average care. For preparing the soil of new greens and tees it may be used at the rate of from 50 to 150 pounds per average-sized green (less in proportion for tees), or from 2 to 4 ounces per square yard. Take care that it is mixed with the soil no deeper than 3 inches. As a top-dressing use one-half these quantities—25 to 75 pounds per green—and mix with twice its bulk of compost, sand, or humus, to ensure its even distribution. \$5.50 per 100 lbs., \$20 for 500 lbs., \$70 for 2,000 lbs.

S. & W. Co.'s Fairgreen Fertilizer. For fairways and for large areas of turf generally. Use at the rate of from 500 to 1500 pounds per acre when preparing new land. Take care that it is mixed with the soil no deeper than 3 inches. To improve existing turf, use one-half this quantity (thus allowing 250 to 750 pounds per acre). Has a quick effect upon grass and the improvement is lasting. May be used during spring, summer, or fall. Is a desirable grass food and it will not burn if it is not used in excess of the foregoing quantities. \$4.50 per 100 lbs., \$15 for 500 lbs., \$50 for 2,000 lbs. Write us for carload prices delivered to your station.

S. & W. Co.'s Anticlover Manure. For putting-greens, tees, and fine lawns. Is a complete plant-food, but stimulates chiefly the grasses. These are encouraged to grow at the expense of clovers and other leguminous weeds. The grass is seen to improve after the first top-dressing, and under average conditions clover will disappear after a few applications. Should be applied as a top-dressing to existing turf every spring and fall, at the rate of 25 to 75 pounds per average green, mixed with twice its bulk of compost, sand, or humus, to make certain that it is applied properly. For smaller or larger areas, allow 1 to 2 ounces per square yard. \$6 per 100 lbs., \$25 for 500 lbs., \$80 for 2,000 lbs.

S. & W. Co.'s Fertilizing Meal. A light, mealy substance, high in plant-food, the purpose of which is to nurse newly sown grass along, nourishing and protecting it and pushing it to quick maturity. It is designed to be broadcasted on the young turf at the rate of 4 ounces per square yard, 150 pounds per average green, or 1,500 pounds per acre. Apply at any time of the year as soon as young grass has grown to be an inch high. \$6.25 per 100 lbs., \$27.50 for 500 lbs., \$90 for 2,000 lbs.

For a general description of fertilizers and manures, see table between pages 20 and 21.

Mixing Fertilizers

Fertilizers may be applied mixed together, with the exception of Lime, Acid Phosphate, and Basic Slag. These should be given as separate dressings, except that a quantity of top-soil, sand, or humus may well be used as a filler or distributor. It is advisable to use such a filler or base when any fertilizer is applied to a small area in the proportion of two parts by bulk of compost, sand, or humus to one part of the fertilizers to be applied. (It is generally not practical to use a

base when fertilizing large areas—fairways for example.)

The use of a filler ensures an even distribution of the active material, avoids any burning of the grass, protects the plants, and may be employed to improve the mechanical condition of the land. For example, greens on heavy land will be greatly improved by the continued use of sand with every top-dressing; the advantages are obvious of employing humus to aid in the distribution of fertilizers to light, hungry soils.

Sheep on a Golf-Course

On light land, the presence of sheep is generally very advantageous. They keep the fairways well cropped, and, generally, in their feeding they are very thorough. The effect of their treading in firming and compacting light land is very valuable, and their manure is rich in plant foods.

They will generally not do much damage to putting-greens, because the grass on the green is always kept so well cut that there is little temptation to cause them to leave the longer grass of the fairway. On medium or heavy land, or in any soil during wet weather, sheep should be rigorously excluded.

Top-Dressing Putting-Greens

The farmer crops his land once, or perhaps twice a year, and he endeavors to return to the land in manure and chemical fertilizers approximately the same or a rather larger quantity of nitrogen, phosphoric acid, potash, and lime that his crops have taken from the land. The greenkeeper is cropping his greens every one or two days, and in a similar manner should return to the soil that which is taken from it. It is true that grass clippings may be left on the turf to decay and return their elements to the soil, but this is a very slow process, and in the meanwhile the grass suffers in texture and quality if the clippings are allowed to remain; further, the continued scattering of grass leaves, which dry into hay, gives the turf a light color, and the whole green is displeasing to the eye.

To return to our farmer: he is growing crops which root anything from 10 to 24 inches into the soil. With turf we have a crop which roots 4 inches only: this means that for success the top 4 inches must be of the highest quality that can be procured, and it also means that the wastage of plant-foods carried down into the soil by rain- and drainage-water is many times greater than the loss suffered by the farmer. Hence it has been found in practice that it is very necessary to top-dress the greenkeeper's growing crop, just as certainly and far more frequently than the farmer manures his. The best method to pursue is to arrange for top-dressings so frequently that they can be very light in quantity—so light, in fact that after being applied they are practically invisible after the first watering.

Top-dressings should consist primarily of a base of such material that will:

1. Correct any mechanical defects in the soil. Sand, for example, is good for sticky soils, Top-Soil for light soils, Mushroom Soil or Humus for land deficient in vegetable matter.

2. All other things being equal, it is best to use a material which at the same time affords some food for the grass. Mushroom Soil, or Cotton Seed Meal would come under this head.

3. Be free of weed seeds. Top-Soil is invariably full of weed seeds of one kind or another, and should be used only after samples of it have been spread on a flat surface for a few weeks to ascertain what and how many weeds develop directly from it.

Following is a list of suitable top-dressing bases:

Compost (A specially compounded mixture that should be available on every course. See page 21.)

Sand	Charcoal
*Humus	Screened Peat-Moss
Cotton-Seed Meal	*Top-Soil
*Mushroom Soil	*Screened and washed Ashes
*Rotted Stable Manure	*Certain factory by-products

*These materials should only be used after thorough test to ascertain their freedom from weed seeds and—very important in the case of strange substances—that they are harmless to plant-life. To the base, selected with a view to the soil requirements, will be added such other materials as the condition of the turf seems to indicate. In other words, the base serves as a carrier to distribute quickly and evenly whatever plant-foods the green-keeper decides to use. These plant-foods have been listed (at least those more generally used) on table following page 20, from which the greenkeeper will be able to make his selection.

It is a good plan to start a system of regular top-dressings every three weeks. If the grass is in good shape, and its condition does not really call for definite feeding, then give the top-dressing of base only: Sand, Humus or Mushroom Soil. The point is to "nurse" along one's greens by these oft-repeated dressings.

The application is simple, about three or four wheelbarrow-loads of the base, mixed with the determined quantity of the plant-food, is turned several times with spades, screened and broadcasted by hand over the green.

The principles of top-dressing a fairway are essentially the same as above, except, of course, the dressings cannot be given as often. Once a year is as much as most clubs can afford, although twice a year, spring and late summer, would generally repay the club for the expense involved.

A reference to the tables between pages 20 and 21 will give an idea as to quantities generally used, both of base materials and the more active chemicals. These quantities may be adopted so far as the fairway dressings are concerned, but they may be reduced materially when the regular three-weekly dressings are given to the greens. Reduce the base materials sufficiently that play will not be interferred with and that the appearance of the turf will not suffer, and reduce the active materials by one-quarter to one-half. For example, while the average quantity of Emerald Dressing is given at 75 pounds for a putting-green, if given very frequently, it may be wiser to make this 40 to 60 pounds.

Ants

These troublesome pests may be generally got rid of as follows:

1. Purchase a supply of bisulphide of carbon, and a Stumpf & Walter Co.'s funnel and skewer.
2. Make three or four holes with the apparatus on and near to each ant-hill, and
3. Inject into each hole about a teaspoonful of the bisulphide, taking care that the material is not spilled onto the surrounding grass.
4. Close the hole by pressing on it with the shoe.

Select a day for the job when there is no wind blowing. Bisulphide of carbon will kill the grass if any is spilled upon it.

A well-known greenkeeper in the metropolitan district

draws our attention to the ease with which ants may be eradicated from greens by means of a lawn-sweeper, as described on page 34. He had a green that was literally covered with ants, and was at a loss to know what to do to rectify the condition. Various poisons had been used with little effect, but a few sweepings with the machine-brush entirely cleared the green of them. After collecting the ants in the box of the sweeper it is essential that they be killed quickly—a good way is to dump the contents of the box onto a fire. Select a time for the brushing when the ants are working, and by repeating the treatment for a few mornings ants will cease to be a trouble.

Moles

Many courses are troubled with this annoying little animal. The best plan to get rid of him is to use a number of mole-traps of an up-to-date pattern, and place them in position immediately over the end of the mole's run at the spot where he is known to be working. There is one point to bear in mind in regard to the mole, and that is he possesses an extraordinarily keen sense of smell, so much so that he can immediately detect the fact that the human hand has touched the trap that has been set for him; so, in using mole-traps, it is always advisable to let them remain exposed to the air for a few days before setting, and to always work with them

with the hands gloved. It is of further advantage if the gloves be buried for a day or two in soil before using.

We have had good reports regarding "Mo-Lo," a recently introduced mole poison, and we list this preparation on page 39.

There are several methods of exterminating moles by means of poison, and in cases where the ordinary means do not suffice to keep them under control, we will gladly give details of schemes, which we have and which we know to be effective, to any green-keeper or other person interested. We suggest that you write us.

Worms in Putting-Greens

THE PRO AND CON

Worms aerate the soil—they allow air to penetrate further and more freely than it will in soil that does not contain worms. They drain the land—water will flow more freely into the subsoil through their burrows than through the rest of the soil. Worms add to the fertility of the soil by taking into their systems portions of the subsoil, and, by a process akin to digestion, modify it; materials needed for food are extracted and materials excreted by the worm are added to it; this modified soil is ejected in the form of casts, and experiments have shown that the soil of worm-casts is very fertile. Further, worms are a symptom. Their presence is an indication that the soil possesses any one or more of the following:

An excess of moisture.

Defective drainage.

An excess of humic material or vegetable matter.

Over acidity.

Need for lime.

Has been overdosed with Bone Meal, Tankage or other animal manures.

Enough of the pro; now for the con. Worms are disagreeable in appearance and to many people nauseating; their casts invariably contain weed seeds brought up from the depths below and placed amid conditions favorable to growth. Worm-casts make putting impossible. They may be removed by brushing, but the brushing has to be done immediately the casts are formed, otherwise the grass is smothered and killed in patches; this means brushing daily at least, and such brushing, though beneficial when done in moderation, is a very serious cause of damage when done continuously. Any casts that are made between brushings are either rolled flat or trodden flat by the players, in both cases making a bare patch from 2 to 3 inches in diameter which does not heal under ten days. Fine grass is injured by the continued movement of earthworms through its roots in the same way as a plant in a flower-pot is injured by the working of a worm among its roots. A wormy green is unplayable in spring or fall or any other time when the turf is warm and wet.

You have, then, the pro and con of earthworms. If you

decide to keep them this section has no further interest for you. If you decide to get rid of them, there are several ways by which you may do so.

In the first case, you may use corrosive sublimate, a dangerously poisonous chemical which you may mix with sand at the rate of one pound of the sublimate with 100 pounds of sand. This mixture is sufficient for a space of 4,000 square feet; spread it over the turf and water it in. The advantages of this method are that it is comparatively cheap; we offer sublimate at \$2.50 per lb.; it is easy to apply; it is effective against such worms as are close up under the surface. Its disadvantages are the risk of using a chemical with such dangerous possibilities; its effectiveness is dependent upon the depth to which it is carried (naturally) and the fact that when it reaches the worm it may not be sufficiently strong to be potent.

We prefer a worm eradicator of the non-poisonous, dry-powder type. We consider "Vermol" to be the best of this class, and we recommend it above all others because it is easy to apply, very safe, and, in our opinion, does more efficient work than corrosive sublimate. We believe the reason for its high efficiency lies in the fact that it does not entirely dissolve in the water used for washing it into the turf, but *remains partly in suspension*. With chemicals in solution, water can be added up to a point beyond which the solution commences to become too weak to be effective. Consequently *there is a limit* to the amount of water you can use, and a limit to the depth to which the chemical can be carried. With the powder in suspension, however, it is easily seen that the more water is used the further down into the soil the material is carried: so, practically speaking, *there is no limit* to the quantity of water you may use with "Vermol." The more water you use the deeper is the material sent and the more earthworms do you kill. Further, "Vermol" has considerable value as a grass fertilizer and may well take the place of one of the occasional top-dressings recommended elsewhere in this book. "Vermol" not only brings the worms to the surface, but kills them: curiously enough it is guaranteed quite harmless to animal and bird-life, and it does not sterilize the turf.

"Vermol" is an imported preparation which we have recommended for a number of years. We will gladly mail you a generous sample free of charge, for you to experiment with. Write us.

"Vermol" Worm Eradicator

The best of the non-poisonous class of worm-killing preparations. A powder that is harmless to animals, but remarkably effective in promptly bringing earthworms to the surface and *killing them*. Of definite value, too, as a grass food.

PRICE.—Ton \$125, $\frac{1}{2}$ ton \$65, $\frac{1}{4}$ ton \$35; three tons or over at \$115 per ton. F. O. B. New York, Chicago, Pittsburgh, Detroit and San Francisco. Used at the rate of $\frac{1}{2}$ lb. per square yard.

When to Apply "Vermol." At any time of the year when the worms are "working;" that is, when they indicate, by producing worm-casts, that they are close up under the surface of the soil. Worms are generally "working" during settled spells of warm, damp, overcast weather, and such conditions usually are suitable for applying "Vermol." They are deep in the soil, and conditions usually are unsuitable for applying "Vermol" when the weather is cold, hot, sunny, or windy.

How to find if conditions are favorable for applying "Vermol." Take approximately a pound of the powder, spread it on a piece of wormy turf measuring 1 by 2 yards and water it freely with hose or watering-can. If many worms come to the surface quickly, the conditions are right for a general application of "Vermol." If only a few worms appear, either the conditions are such that it is advisable to defer further experiments until another occasion, or the particular piece of turf is not so badly infested as was thought.

How much "Vermol" to use. Figure up roughly the length and width of the green or tee in yards. Multiply together and divide by two: answer is the correct quantity of "Vermol" in pounds for the particular job. The powder is applied at the average rate of half a pound to the square

yard, and a green measuring 25 by 20 yards, for example, will need 250 pounds of "Vermol," and an eighteen-hole course, with greens of these dimensions, would require two to two and a half tons.

How to apply "Vermol." Having ascertained that the worms are "working," carry the proper quantity of "Vermol" to the green, spread the powder evenly, then with one or more lines of hose proceed to flood the green with water. Use plenty, and do not hesitate to take advantage of a high pressure.

If water is not laid on to your greens, apply "Vermol" during rain.

Worms will appear by the thousands and will quickly die. At the end of an hour the last worm will probably have come to the surface, when the green should be swept and the dead worms gathered and placed on the compost heap, as they quickly decompose.

It is a good plan to let the sprinklers run for a short while and next morning to again collect the worms: a few will have appeared during the night.

"Vermol" will not injure the grass. We have supplied it for a number of years, and it has always given complete satisfaction. It is used everywhere.

White Grubs

During the late summer and fall the ravages of the *white grub* manifest themselves in the fairways and putting-greens of many golf courses. The grubs eat off the roots of the grass plants, causing the grass to die back in characteristic patches.

A recent Bulletin of the U. S. Golf Association recommends that *cyanide of soda* be applied in solution at a rate approximately of 1 ounce mixed with 5 gallons of water: this quantity serves for 20 square feet (say 5 feet by 4 feet). The solution may be poured on to the turf from a watering can, and in using it at this strength no injury to the grass has been detected. Great care, however, must be exercised, as *cyanide of soda* is one of the deadliest poisons known to man.

For small areas a safe and equally effective method is to inject *carbon disulphide* into the soil by means of a specially constructed funnel. Make holes 4 inches deep and 4 inches apart and pour the chemical into them, using one pound per 8 square feet. The disulphide is applied without dilution, and a funnel is necessary to get it down into the soil without touching the grass—otherwise the grass will be burned. A suitable funnel is offered on page 30.

The grubs are soft-bodied animals, and in good weather are found close up under the surface. Heavy rolling is therefore recommended as likely to destroy many of them.

After the above treatments the usual method of renovating the turf should be undertaken.

Fungous Disease

The Brown-Patch Fungus appears without warning in highly cared for putting-greens, commencing with small bare patches, gradually enlarging and finally merging one into another until the green consists largely of bare areas. There is no doubt but that the fungus is more prevalent in soils that are over-rich in humic material: therefore, in building a green, do not be too lavish with rotted manure, humus, or mushroom soil. We advise dusting the grass with powdered sulphur; dressing with charcoal, or an occasional spraying of the turf with Bordeaux Mixture or Am-

moniated Copper Solution. All these are preventative measures before the disease appears, and dusting and spraying in this manner is also the only thing one can do after the disease appears, but at that time treatment has little effect, as the damage has been done. Some good results may be expected, however, in checking the further spread of the disease. Raking the patches, top-dressing and seeding will, of course, follow this treatment.

A well-known Long Island greenkeeper finds that the patches recover after soaking with mercury bichloride.

Quality in Implements and Tools

It is false economy for a golf club to purchase the cheapest implements it can procure. A putting-green is the result of constant care and thought; it occupies the greenkeeper's mind early and late, day in and day out; it is as perfect a piece of turf as experience, labor, and money can produce; it is in no sense a "lawn," and the ordinary run of lawn-mowers, rollers, rakes, and shovels are positively not good enough for it. The ordinary make of lawn-mower will not cut so closely nor nearly so accurately as will a high-grade machine. Ever get your hair cut with the barber's clippers, and note that sometimes the machine pulls your hair? Evenly adjusted lawn-mowers of the highest grade do not pull the grass, but cheaper ones frequently do. The more expensive

machines are generally geared higher; that is, the knives revolve quicker in proportion to the speed at which the machine is pushed; also, they have more knives on the cutter, and the consequence is that a more even cut is produced. A high-grade machine will outlast two or three cheap ones. One more item: mowers suffer as much from neglect as from wear; the better-grade machines, made of better steel, stand neglect.

And the same thing applies to rakes, spades, rollers, sprinklers, and the hundred and one other articles required by your green staff. The initial purchase may be a trifle higher, but, to employ the well-worn adage, "quality is remembered long after price is forgotten."



Omnes Golf-Ball Marker FOR CLUB USE

Simple to operate, substantial in make-up, and really indispensable in the equipment of an up-to-date club. Any arrangement or number of letters or figures may be marked simply by turning adjusting arrangement. Handsomely finished and really the most complete Golf Ball Marker made anywhere. \$32.50 each.

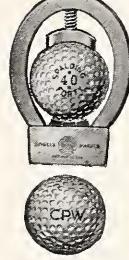


No. 5

Clock Golf

For practice in putting nothing excels this game. The figures are arranged in a circle from 20 to 24 feet in diameter, or any size that the lawn will admit.

No. 5. Drop forged plates with double prongs. \$10 per set of eighteen.



S. & W. Co.'s Simplex Golf-Ball Marker

Patented in United States and Great Britain

No. 1. Impresses initials, but does not injure the ball. Marking being below surface it will not wear off, and will retain pencil, ink or other coloring. Burnished brass. \$2.75 each.



No. RB. Made with composition golf ball top. White enameled. \$1.25 per pair.

No. WB. Similar to No. RB, but made of wood, painted plain white. \$1 per pair.



No. 10. Round metal plate to lie flush with ground; drop forged. \$1 per pair.



No. RB

Measuring Tape

Especially adapted for laying out tennis courts and golf-course work. With this tape one person can easily secure accurate right angles, yet the tape is equal to any other for straight measuring also. Enclosed in hard leather case, flush handles with patent automatic handle opener; all mountings nickel-plated. Accuracy guaranteed. **No. A.** 50 feet. \$6 each. **No. B.** 100 feet. \$10 each.

All prices subject to change without notice. All orders will be accepted only subject to our ability to supply the goods. Prices shown are those in effect March 1, 1922



How Early Birds are kept busy on the country's leading Golf Courses

Early Bird Rakes

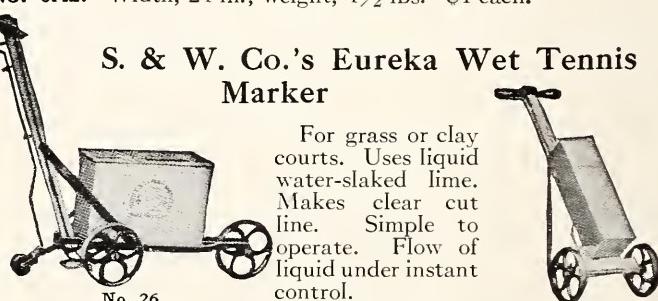
The Early Bird Putting-Green Rake has been found to be a better, more efficient, and economical implement for cleaning the greens than any yet on the market. It will leave the green smooth and clean. The Early Bird Rake is unqualifiedly endorsed by leading golf professionals, golf-course experts, greenkeepers, and players who appreciate the importance of a perfect putting surface.

We offer it in two sizes.

No. 0A6. Width, 30 in.; weight, 8½ lbs. \$8 each.

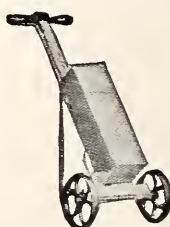
No. 0A2. Width, 24 in.; weight, 4½ lbs. \$4 each.

S. & W. Co.'s Eureka Wet Tennis Marker



No. 26

For grass or clay courts. Uses liquid water-slaked lime. Makes clear cut line. Simple to operate. Flow of liquid under instant control.



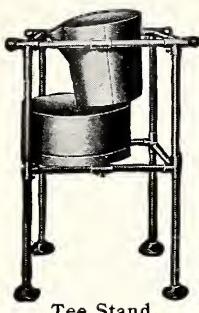
No. 11

No. 11. Vertical; small tank. \$22.50 each.

No. 26. Horizontal, for club use, large tank. \$30 each.

NOTE.—The benefit of a grass seed expert, who has made a life study of this subject, is at your disposal.

Golf-Course Equipment



S. & W. Co.'s Tee Stand

Compact arrangement for golf tees. \$18 ea.

S. & W. Co.'s "Cherokee" Golf Ball Washer

Patent applied for

Takes off everything but the paint. Should be at every tee of a well appointed course. Used on prominent courses. \$18 each.

Separate brushes for washer, \$1 each.



"Cherokee" Golf Ball Washer

S. & W. Co.'s Golf-Ball Paint		Each	Doz.
WHITE ENAMEL		\$0 75	\$8 25
1/4-pt. can.....		50	5 50
RED ENAMEL		75	8 25



S. & W. Co.'s Golf Ball Retriever

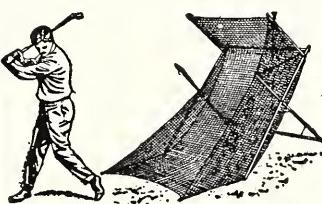
Bamboo pole; wire basket; well made. \$3 each.

Golf Ball Racks

Useful on much-frequented courses. Each player or one player in a party drops his ball in the rack when he arrives, his relative position being determined by the position of



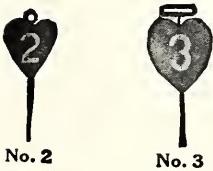
the ball in rack. Substantially made of iron, heavily japanned. For 36 balls. \$18 each.



Eureka Golf Driving Net

For practicing, especially iron approach shots. May be put up almost anywhere. Complete with different colored pockets in net, uprights, etc. \$18 each.

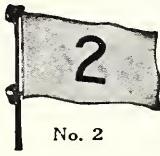
S. & W. Co.'s Marking Discs and Flags



No. 2

No. 3

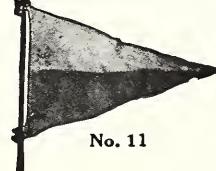
No. 7



No. 2



No. 9



No. 11



No. 10F Flag
Attached to No. F
Flag Support

Marking Discs

Metal Discs, painted Red and White and numbered 1 to 18 to designate the number of hole. The iron shaft is strongly fastened to disc and is about 4 feet long.

No. 3. Heart shape.....	Each \$2 00	No. 2. Miniature Marking Discs. Heart Shape, for Each Putting-Courses.....	\$1 00
No. 7. Circular holder, without flag.....	2 00	Separate Flag for No. 7 Disc.....	1 00

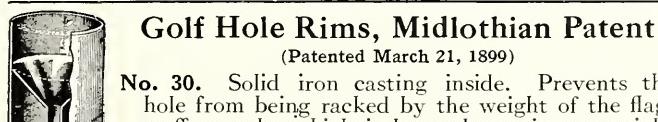
Direction and Marking Flags

Colors: Red, White, Red and White, Blue and White, and other combinations of colors.

No. 9. Flags only, oblong shape.....	Each \$0 50	No. 11. Flags only, triangle shape.....	\$0 65
No. 2. Flags, numbered as ordered.....	75	No. 10F. Flags, with attaching hooks, for use with No. F supports, listed below.....	1 00

Marking Flag Supports and Poles

No. F. Flag Support, iron upright, with revolving flag holder. Pat. April 5, 1912.....	Each \$2 75	No. BX. Bamboo Poles, 10 feet, with spike.....	\$2 00
No. BSF. Bamboo Poles, with spike and patent flag support attached.....	3 25	No. C. Cherokee holder for bamboo flagstaff.....	1 35
		No. BF. Bamboo Poles, with brass ferrule.....	1 50
		No. B. Bamboo Poles, plain, 18 feet.....	50



Golf Hole Rims, Midlothian Patent

(Patented March 21, 1899)

- No. 30. Solid iron casting inside. Prevents the hole from being racked by the weight of the flag-staff or pole, which is kept always in an upright position, with small hole in iron casting to accommodate iron rod disc upright. \$1.50 each.
- No. 31. Similar to No. 30, but hole large enough for bamboo poles. \$1.50 each.

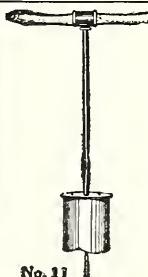
S. & W. Co.'s Iron Hole Rim

- No. 20. For lining holes in putting green. The cross-piece prevents ball from falling to bottom of hole. 75 cts. each.

- No. 25. Combination style. Suitable for bamboo or iron rod. \$1 each.



No. 20



S. & W. Co.'s Steel Hole Cutters

- No. 11. Improved style with point for centering, and device for ejecting earth and sod after cutting clean hole. Cutter is of best steel and has substantial wood handle. \$12 each.

S. & W. Co.'s Hole Rim Extractor

- No. EX. For extracting Nos. 30 or 31 Hole Rims. 70 cts. each.

Hole Rim Setter

- No. 6. For setting the hole rim and leveling edges around same. \$2.50 each.

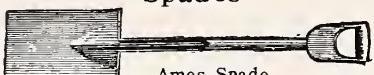


No. 6

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Implements of General Use on a Golf Course

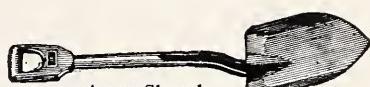
Spades



Ames Spade

Ames Spades	are the same grade as the celebrated Ames Shovels.
D Handle and Long Handle	Each \$2.25
S. & W. Co.'s Spades	are the same grade as S. & W. Co.'s Shovels.
D Handle and Long Handle	Each \$1.75
Boys' Spades.	Special finish. 1.75

Shovels



Ames Shovel

Ames Shovels	are the best manufactured; give best service.
Square Point, D Handle	Each \$2.25
Round Point, D Handle	2.35
Long-Handle Shovels	same price.
S. & W. Co.'s Shovels.	
Square Point, D Handle	1.75
Round Point, D Handle	1.85
Long-Handle Shovels	same price.

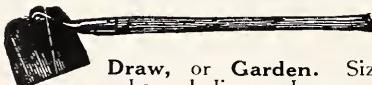
Hoes



English Scuffle Hoe.	Imported. Positively the best. The quality of material used and finish is superior to all others.
Each	Each
4-in.	\$1.00
5-in.	1.10
6-in.	1.20
7-in.	1.30
Extra-strong handles, 4½ ft., 50 cts.; 6 ft., 80 cts. each.	
8-in.	\$1.40
9-in.	1.50
10-in.	1.70
12-in.	2.00

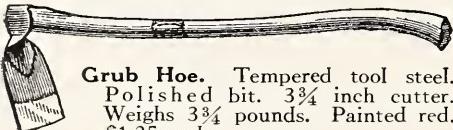
Warren, or Heart-Shaped. The best Hoe for weeding. Each

Small size.	\$1.25
Medium size.	1.40



Draw, or Garden. Sizes for boys, ladies, and men.

Each	Doz.
5-in.	\$0.90
6-, 6½-, 7-, and 7½-in.	1.10
	9.00

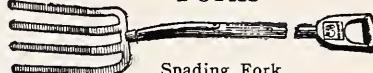


Grub Hoe. Tempered tool steel. Polished bit. 3¾ inch cutter. Weighs 3¾ pounds. Painted red. \$1.25 each.

Screens

Handy for compost, soil, sands, gravel, etc. Extra-heavy wire; spruce frames, square mesh. Small size, 25 x 62 in., \$8.50; large size, 28 x 66 in., \$9.50. State whether ¼-, ½-, ¾-, or 1-in. mesh is desired.

Forks



Spading Fork

Spading Forks.	Best grade; tines spear-pointed with diamond-shaped backs; handle strapped both sides. Of superior quality and very strong.
4-tine, D Handle	Each \$1.85
5-tine, D Handle	2.40
Long-Handle Forks, same price.	

Manure Forks

Manure Forks.	Best grade; strong oval tines.
4-tine, D Handle	Each \$1.85
5-tine, D Handle	2.00
6-tine, D Handle	2.25
Long-Handle Forks, same price.	

Hay Forks

Hay Forks.	Best grade; strong oval tines, made only with long handles.
2-tine, Long Handle	Each \$1.20
3-tine, Long Handle	1.30
4-tine, Long Handle	1.45
Boys' Spading Forks.	1.00

Picks and Mattocks



Contractors' Picks. Both ends pointed. Tempered tool steel. \$1.65 each.



Cutter Mattocks. Tempered tool steel. Painted red. Polished edges. \$2 each.



Pick Mattocks. Tempered tool steel. Painted red. Polished ends. Weight about 6 lbs. \$1.75 each.

Garden Line Reels

Malleable Iron. Holds 100 feet. \$1.25.

Eureka. Galvanized steel.

Single, 500 feet size, \$3.25. Double, 1,000 ft. size, \$4.

Garden Line

Best Braided Linen. 100 feet, one length, \$1.50. 200 feet, one length, \$2.75

Bamboo Basket

Better known as Long Island Potato Basket. Woven split rattan; handle opening under rim. Well made. A very useful type for a golf course.

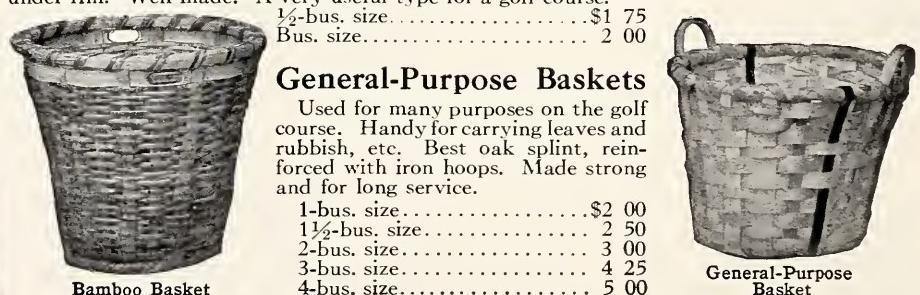
½-bus. size \$1.75
Bus. size 2.00

General-Purpose Baskets

Used for many purposes on the golf course.

Handy for carrying leaves and rubbish, etc. Best oak splint, reinforced with iron hoops. Made strong and for long service.

1-bus. size	\$2.00
1½-bus. size	2.50
2-bus. size	3.00
3-bus. size	4.25
4-bus. size	5.00



Rakes



Reversible Steel. Suitable for lawn and garden. Has 24 teeth. 75 cts. each.

Steel-Bow Garden.	Extra strong; will not break in the middle.
12-tooth	Each \$1.10
14-tooth	1.20
16-tooth	1.30

Steel Garden.	Cut from one piece of steel; strong and durable.
10-tooth	Each \$0.90
12-tooth	1.00
14-tooth	1.10
16-tooth	1.20

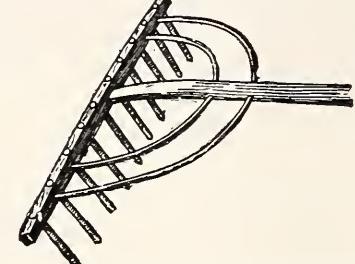
Steel Gravel. Like the Garden Rake. Made substantial, with short teeth.

14-tooth Each \$1.20

16-tooth 1.30

18-tooth 1.50

A charge of 50 cts. per Rake is made when any of the above are ordered specially sharpened for renovating turf.



Wood, Hay and Lawn. Made light and substantial, with tubular steel bow; does not break like the wood bow.

12-tooth Hay Each \$1.20 Doz. \$12.00

24-tooth Lawn 1.50 15.00

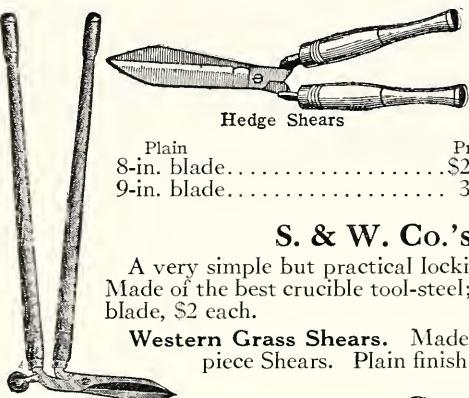
NOTE.—The benefit of a grass seed expert, who has made a life study of this subject, is at your disposal.

Stumpf & Walter Co.'s GOLF TURF

IMPLEMENTS, continued

Hedge Shears

Solid steel blade, crucible tool-steel, tempered to hold an edge. Give good service. Shears with notch are the best for cutting heavy stems of hedge plants.



	Plain	Price
8-in. blade.....	\$2 75	
9-in. blade.....	3 00	

	Plain	Price
10-in. blade.....	\$3 75	
Ladies'.....	2 50	

	With Notch		
	8-in. blade.....	\$3 00	
	9-in. blade.....	3 50	

	10-in. blade.....	4 00	

S. & W. Co.'s Grass Shears

A very simple but practical locking device holds the Shears together. Made of the best crucible tool-steel; polish finish. One size only, 6½-in. blade, \$2 each.

Western Grass Shears. Made of good quality tool-steel. A one-piece Shears. Plain finish, 6-in. blade, \$1.50 each. A leather shield is furnished with each Shears.



Border Shears

Designed to trim the overhanging grass on borders around flower-beds and walks. 9-in. blades of high-grade tool-steel; polished handles and blades. Without wheel, \$5 each; with wheel, \$5.50 each.

Grass Edging or Border Shears



Lawn Shears

Designed to cut grass under hedges, fences, grape arbors, and flower-beds or shrubs. 9-in. blades of high-grade tool-steel, polished handles, and blades. Without wheel, \$5.50 each, with wheel, \$6 each. Notice: When shipping the above Shears, unless stated on orders, we send Shears with wheel.

Lawn Shears



Imported English. Has a riveted back, broad, thin, light blade. Best Scythe for cutting grass, rye, oats, etc.
30-in.....\$2 75] 34-in.....\$3 25
32-in..... 3 00] 36-in..... 3 50

The benefit of a grass-seed expert—one who has made a life study of this subject—is at your disposal

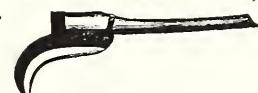
Scythes



The Little Giant. Has a ribbed back, is heavier and better adapted to rough work.
32-in.....\$2 00] 36-in.....\$2 40
34-in..... 2 20] 38-in..... 2 60

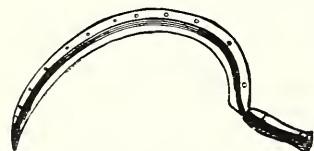
Scythe Snath, or Handle. The very best, with patent socket. \$2.25 each.

Bush Scythe. High-grade steel blade. Painted red. 18-in. \$1.25 each; 20-in. \$2 each.

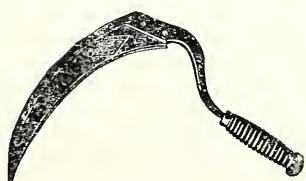


Bush Hook. Forged steel. 36-inch hickory handle. \$3 each.

Grass Hooks



Imported English. With heavy riveted back, thin cutting blade; easy to sharpen; forged from the best-grade steel.
No. 2, 90 cts. each; **No. 3,** \$1 each;
No. 4, \$1.15 each.



Blue Ribbon. Tempered steel blade; black-enamaled handle. Used also for a Corn Hook and for clipping hedges. Blade can be detached and packed for parcel post. 60 cts. each, (3 lbs., packed).

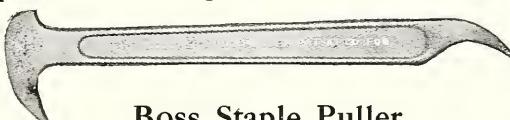
Wire Stretcher and Tackle Block

A Handy Tool for Every Golf Course

No. 2 Stretcher. Shipping weight, 5 lbs., \$2.25 each.

These are useful for all purposes of tackle blocks, and at the same time are excellent wire stretchers. All the metal being wrought and malleable iron, they are practically indestructible and are strong enough for strain of at least half a ton.

Directions.—For stretching wire, place the hook around the post, and secure the wire in the eccentrics; then pull the wire tight and secure the rope to the post. Then staple the wire securely. To unite the ends of wire, fasten one end in each eccentric; then draw them up and twist them together.



Boss Staple Puller

The simplest, strongest and most perfect staple puller ever made. Pulls the staples with one blow of a hammer and does not injure the fencing. 11½ inches long, made of the best cast steel and is light and strong. Mailing weight 1½ lbs. 75 cts. each.

POST-HOLE DIGGERS, Iwan's Split Handle. 6 inch, \$2.50 each.

Perfection. \$1.50 each.

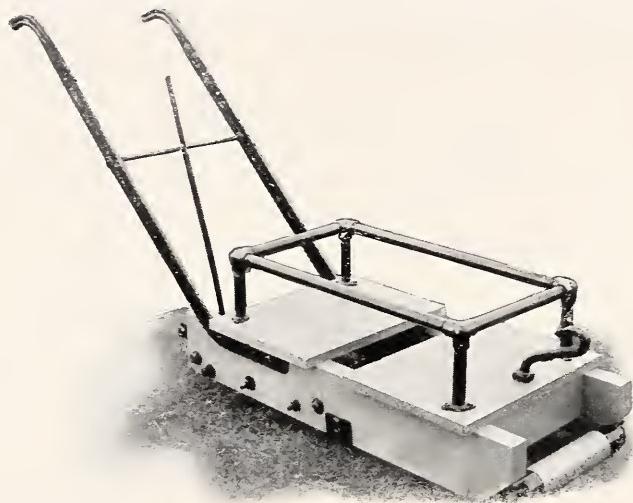
Gibb's Lock Lever. \$2.50 each.

POST-HOLE AUGER. 6- and 7-in., \$1 each; 8- and 9-in., \$1.25 each.

IWAN WELL DIGGER. 6-in., \$1.85 each; 8-in., \$2.15 each; 9-in., \$2.50 each.

Sodding Equipment

The Champion Sod Cutter (Horse-Drawn)



The Champion Sod Cutter is the result of many years of practical experience and is the most wonderful labor-saving device ever invented. This machine will cut in one hour as much sod as two men can cut in a day; in a day the Champion will cut from 25,000 to 35,000 feet of sod, and at this rate you can save the price of a machine in a short while.

This machine is so constructed that it can be adjusted to cut the sod the one uniform thickness, 1 to 2 inches, 12 inches wide. This is very important, especially when a vast amount of sod is to be laid. One man can lay as much sod as three or four men can by the old method of cutting.

\$50 each



Narrow Trowel

Of use in extracting dandelions and other weeds from turf.
5-in. 20 cts. each; 7-in. 30 cts. each.

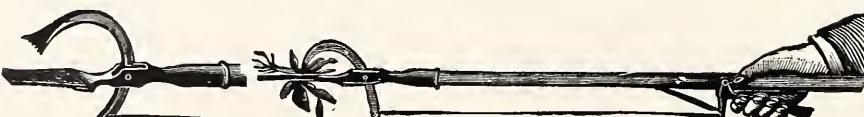


S. & W. Co.'s Special Chisel Knife

Similar to an asparagus knife, but shorter. Made especially by us for extracting weeds from putting-greens. \$1 each.

NOTE

The benefit of a Grass Seed Expert, who has made a life study of this subject, is at your disposal.



Cleveland Lawn Weeder

Is simple to operate and not only saves the back, but is actually a pleasure to use. The cut is a good illustration, showing how to work it. \$1.50 each, \$15 per doz.

S. & W. Co.'s Sod Perforator

The best low-priced device for renovating bad spots in lawns, terraces, greens, etc. Before sowing grass seed, use the Sod Perforator. The operation permits the seed to enter the soil, where it is covered with fertilizer or by sprinkling the surface. The seed will germinate and come up uniformly, producing a vigorous growth of rich grass. The spikes are firmly set in an oak block, made in two halves and put together with screws. The handle is the right thickness and length. 12 x 12 in., \$4.50 each.

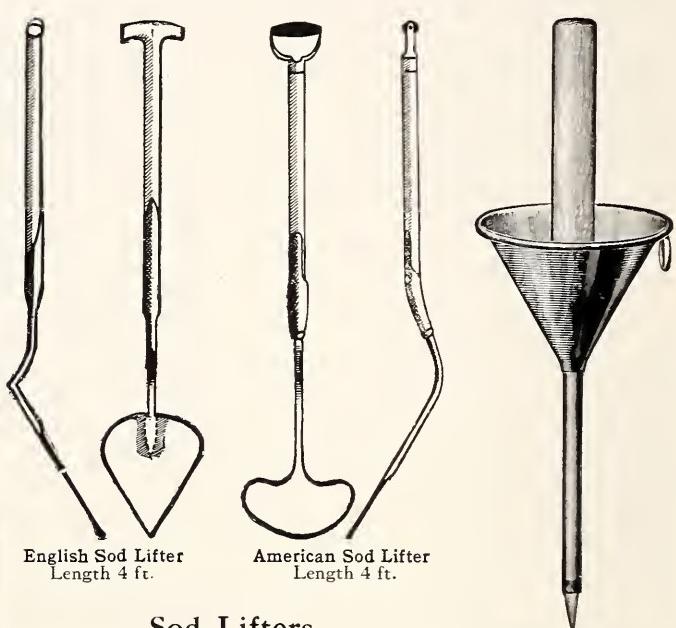


S. & W. Co.'s Iron Sod Tamper

This Sod Tamper is in demand for the laying of sod. It is used on putting-greens and terraces; also in the spring for compacting the sod after the frost has disappeared. The Tamper is square. A wooden handle of right size is firmly secured to the Tamper.

Size, ins.	Weight lbs. each	Price
8 x 8	17	\$2 75
10 x 10	20	3 00

S. & W. Co.'s Iron Tamper



Sod Lifters

English Pattern. Heart-shaped, strong, and highly efficient. \$6.50 each.

Funnel and Skewer
Length 12 ins.

American Pattern. Preferred by many on account of its light weight. \$2 each.

Stumpf & Walter Co.'s Funnel and Skewer

Specially designed for applying carbon disulphide through the turf into the soil. \$1.50 each.

Carbon disulphide will burn grass; hence it is necessary to employ a device of this nature to convey it through the grass down into the soil.

Implements



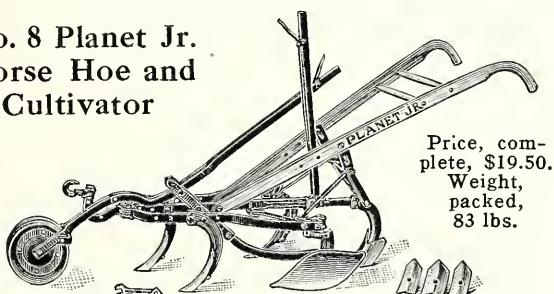
The Oliver Chilled Plow
STEEL BEAM STYLE

The Oliver Chilled Plow is adapted for sandy and stony soils. As a general-purpose Plow it is acknowledged to be the best. Made in one-horse and two-horse sizes, with steel and wood beams.

	Capacity	Steel Beam	Wood Beam
No. B-C One-horse, light.....	5 x 10 in.	\$12 00	\$10 00
No. 10 One-horse, heavy.....	5½ x 11 in.	14 75	12 75
No. 19 Two-horse, medium.....	6½ x 12 in.	15 75	
No. 20 Two-horse, medium.....	7 x 13 in.	17 50	
No. 82 Two-horse, light.....	7½ x 13 in.	15 00	
No. 83 Two-horse, medium.....	7½ x 14 in.	16 00	
No. 84 Two-horse, heavy.....	9 x 16 in.	17 50	

Plows with wheel, add \$2.25. Plows with jointer, add \$4.25.

**No. 8 Planet Jr.
Horse Hoe and
Cultivator**



Price, complete, \$19.50.
Weight, packed, 83 lbs.

No other cultivating machine is so widely known as the Planet Jr. Combined Horse Hoe and Cultivator, for it is in use throughout the civilized world. It is so strongly built as to withstand incredible strain, yet it is light and easy to handle. This implement is excellent for the periodical cultivation of fallow land prior to seeding. The longer a fairway is allowed to remain after plowing and finally seeding and the more it is cultivated during that period, the fewer weeds will be in your final turf, and the soil will have been brought into the best possible condition.



Solid Steel Scrapers

Necessary in all golf construction work.

No.	Width	Capacity
1	32 in.	7 ft. \$13 00
2	29 in.	5 ft. 12 50
3	26 in.	3 ft. 12 00

**All-Steel Lever
Spring Spike
Tooth Harrow**

This Harrow, having spring action upon the teeth, allows them to yield in meeting an obstruction, thus saving strain or breakage.

For One Horse.

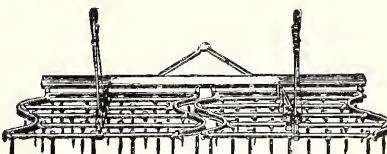
With 25 Teeth in One Section, Spreading. 4 ft. \$11 00
With 30 Teeth in One Section, Spreading. 5 ft. 12 00

For Two Horses.

With 50 Teeth in Two Sections, Spreading. 8 ft. \$20 50
With 60 Teeth in Two Sections, Spreading. 10 ft. 22 50

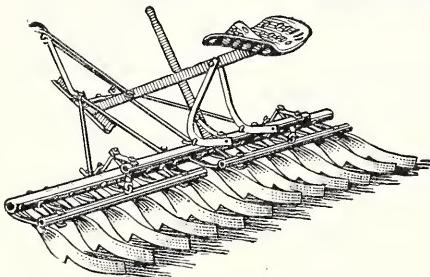
For Three Horses.

With 75 Teeth in Three Sections, Spreading. 12 ft. \$32 00



Steel Disc Smoothing Harrow

The frame measures 6 feet 8 inches by 6 feet, and has four sets of rollers, having 58 discs 8 inches in diameter. A very useful Harrow, \$40 each.

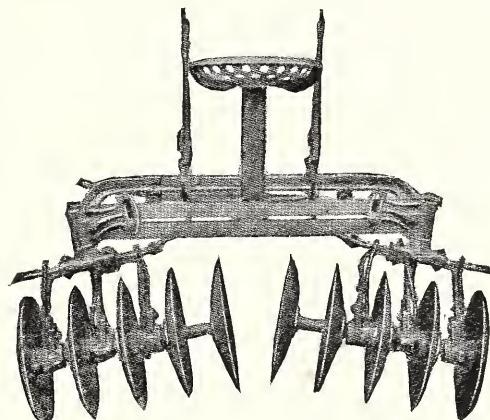


Acme Pulverizing Harrow

A general-purpose Harrow that crushes, cuts, turns, smooths, and levels all in one operation. For reducing clod land into that fine tilth necessary for proper seeding; valuable on fairways.

All sizes are flexible except Nos. G and H.

No.	Each
G	\$14 00
H	18 00
23	28 00
26	32 50
24	62 00
25	38 00



Extension Disc Harrow, with Reversible Gangs

Square braces take the heavy, backward thrust of the gangs. Levers are bolted to the frame and are very rigid. The frame is of angle steel, slotted to allow adjustment of gangs. These can be shifted from one side to the other or just turn them around on the pivot quickly and easily.

With ten 16-inch Solid Discs. \$45 00

The Bendelow Putting-Green Cultivator

A patented device by means of which turf may be aerated, top dressed and seeded. Consists of a steel frame, through the center of which is run a steel shaft on which are fastened fourteen steel circular knives. The machine is pushed over the green the same as a lawn mower, and is recommended for turf that is compacted and "hide-bound"—the result of too frequent rolling with heavy rollers. Price \$100, f. o. b. Chicago.

Seed Sowers, Fertilizer Distributors and Auto-Sprays

S. & W. Co.'s Lime and Fertilizer Sower



This Force Feed Lime and Fertilizer Sower is the most perfect machine on the market for sowing all brands of commercial fertilizers. Nitrate of Soda, Emerald Grass Fertilizer, Fairway Fertilizer, Anti-Clover Manure, Pulverized Limestone, Sheep-Manure, Bone Meal, Dry Wood Ashes, etc. Hopper holds 10 bushels. Actual width of sowing is 8 feet. Capacity from 50 to 4,500 pounds. The screen in the hopper and revolving agitator prevents clogging and packing of material on the feeds and insures an even distribution of fertilizers. All feeds can be instantly shut off or opened to any desired amount. Has two 30-inch wheels with 4-inch concave tires. Shipping weight 360 lbs. \$50 each.

Auto-Spray

Recommended for applying bordeaux mixture to putting-greens. Convenient, durable, efficient. Useful with all solutions, also in applying cold-water paint or whitewash. Holds four gallons. Illustration shows our new "Auto-Pop" attachment which doubles the efficiency by saving half the solution and labor. Tank made of galvanized steel or brass. High-grade hose. Castings for handle, etc., all malleable. No continuous pumping as in the case of the Knapsack Sprayer, nor continuous pumping or slopping as in the case of the bucket pump. A few strokes of plunger compresses enough air to cover half a putting-green.

Auto-Spray No. 1B. Brass Tank, with "Auto-Pop" \$9 00

Auto-Spray No. 1D. Galvanized Tank, with "Auto-Pop" 6 00

2-foot Brass Extension Pipe. 60

2-foot Galvanized Extension Pipe. 50

Brass Elbows for spraying under vines. 35

Torch. 1 50

Brass Strainer for straining solution. 1 20

Bordeaux Nozzle. 1 50

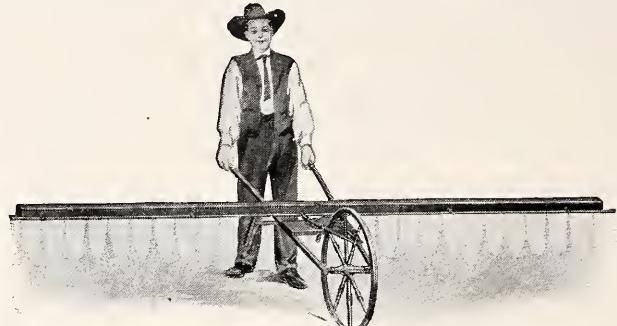


SPRAY POLE FOR TALL-TREE SPRAYING

Bamboo Spray Pole

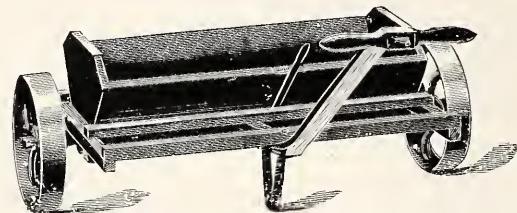
Bamboo Spray Poles are brass-lined to resist the corroding effect caused by strong solutions. Each Spray Pole is equipped with a drip-shield at the top and brass shut-off at the bottom. Spray Poles over 12 feet are not entirely satisfactory, and we do not recommend them. 8 ft. \$4.20 each; 9 ft. \$4.40 each; 10 ft. \$4.60 each; 12 ft. \$5.30 each.

S. & W. Co.'s Wheelbarrow Seed Sower



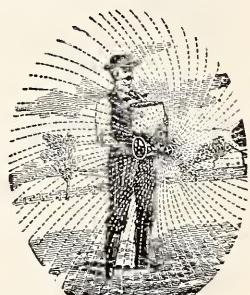
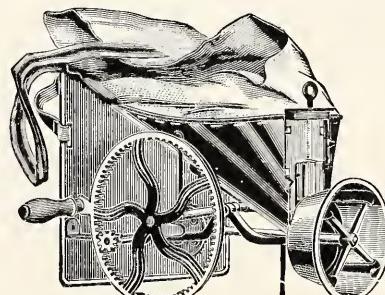
For over thirty years this has been a valuable and indispensable broadcast Seed Sower. Over 200,000 have been sold. We recommend this practical machine for sowing all grass mixtures. It is provided with a double hopper, 14 feet in length and well balanced. One side of this seed hopper is adapted for all heavy seeds, such as timothy, clover, alfalfa, millet, etc. The opposite side sows lighter, smaller seeds, such as Fairway Formula, red-top, blue grass, bent grass, orchard grass, etc. The machine is simple to operate. A boy can work it. The operator can easily regulate the machine to sow any desired quantity to the acre. It does not clog and will sow evenly an area 14 feet wide. Full directions are in each hopper. Weight, 45 lbs. \$16.50 each.

S. & W. Co.'s Hand Fertilizer Sower for Top-Dressing Lawns



Has the same adjustment as a more expensive horse-power machine and will sow all commercial fertilizers. The hopper is 34 inches long and holds one and one-half bushels. Besides top-dressing greens, lawns, etc., it is a handy machine for all kinds of garden and field work. When two blades are removed, it will sow damp sand. Also is an excellent machine in the winter for covering icy roads and walks with sawdust sand, etc. Shipping weight, 83 lbs. \$20 each.

Cahoon's Improved Broadcast Seed Sower



This is the only Broadcast Seed Sower that has come to stay. It is well known as a practical and cheap broadcaster. Wheat, rye, oats, barley, hemp, timothy, millet and Hungarian grass are used in this Seeder. The operator can sow from four to eight acres an hour, walking at an ordinary gait. The seed is scattered from 8 to 20 feet on each side of the operator, according to the kind of seed. The heavy seed, like wheat, is scattered the greatest distance. Packed weight, 8 lbs. Can be sent by parcel post. \$5.50 each.

For Around the Club House

Standard Tree Bands

The first effective device for protecting trees from caterpillars, worms, and insects.

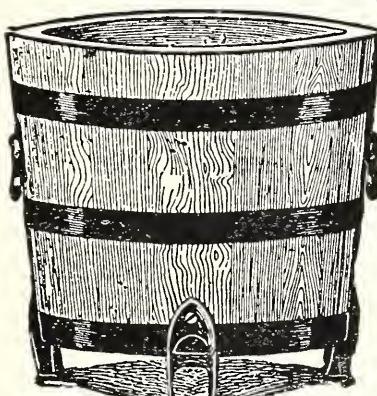
These Tree-bands are made of heavy waterproof paper, with a sticky, repellent material under the umbrella-like canopy. This canopy protects the "gum stickum" from the weather, as well as from dirt, dust, and falling leaves. No climbing caterpillar or insect can pass this sticky material. It catches them and holds them if they set foot upon it. Put up in rolls, 25 and 100-foot lengths, flat when boxed, mushroom-shaped when tacked on tree.

25-ft. roll.....\$1.75 | 100-ft. roll.....\$6.75

Plant Tubs

Plant Tubs, New York Cedar. Made of the very choicest seasoned cedar, highly finished with black hoops; will last twice as long as cypress tubs.

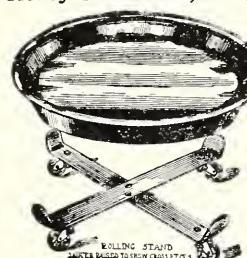
Inside measurement	No. Diam. in.	Height in.	Price
	1.....12.....	10½.....	\$2.50
	2.....13.....	13.....	3.50



New York Cedar Tub

Rolling Stands

Heavy Fiberware, Waterproof. Stand consists of two pieces of steel, securely riveted to four casters. Will support heavy tubs, pots, etc. Can be readily rolled about without injuring the floor. No dampness under the stand. When ordering, give the outside diameter of bottom of tub.



Outside diam.	Takes tubs of bottom diam.	Each	Doz.
12 in.....	10 in.....	\$1.20	\$12.00
14 in.....	11 in.....	1.50	15.00
16 in.....	13 in.....	2.70	27.00
18 in.....	15 in.....	3.00	30.00
22 in.....	20 in.....	3.30	33.00

Illinois Self-Watering Window Boxes

The reservoir in bottom provides the water as needed; it is only necessary to examine the surface of the soil occasionally, and, if dry, to refill the reservoir. A liberal supply of air to the roots is constantly maintained through the sponges, the soil will always be found mealy and loose, and the moisture is always evenly distributed from top to bottom of soil.

Height Width Length Capacity

No.	in.	in.	in.	qts.	Price
1.....8.....	9½.....	.23.....	2½.....	4.25	
2.....8.....	9½.....	.25.....	3.....	4.50	
3.....8.....	9½.....	.27.....	3½.....	4.75	
4.....8.....	9½.....	.29.....	4.....	5.00	
5.....8.....	9½.....	.31.....	4½.....	5.75	

FOR BULBS. Our Self-watering Baskets and Boxes are, without question, the most satisfactory device for growing bulbs ever devised.

FOR FERNS. Nearly every home-lover is a lover of ferns, but few succeed with them. They never fail in Illinois Self-Watering Flower Boxes or Hanging Baskets.

Rustic Hanging Baskets

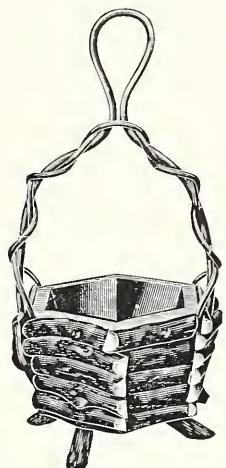
Bowl is hexagon-shaped, covered with laurel; fine finish. Are very attractive when filled with ferns and running plants.

Diam.	Each	Doz.
10 in.....	\$2.25	\$24.00
12 in.....	2.50	27.00
15 in.....	3.00	30.00

TWO BOOKS for the GOLFER

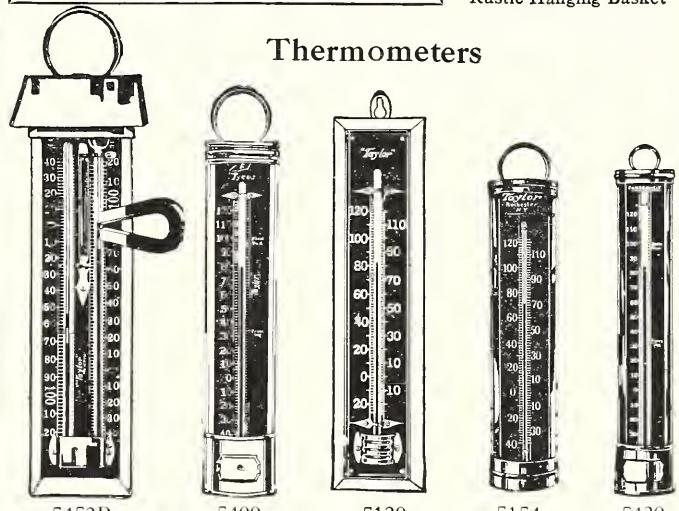
An Authoritative Book on Turf, TURF FOR GOLF COURSES. By C. V. Piper and R. A. Oakley. This is an authoritative and practical treatise on the production and maintenance of grass turf. The subject is treated in its entirety for all sections. Postpaid, \$3.

A Good Book on the Game, GOLF FOR BEGINNERS. Written by David Hunter, Professional at Essex County. Tells the whole story in the fewest possible words. Dave Hunter takes the learner step by step, making the fundamentals so clear that proficiency is assured. Pocket size. Postpaid, \$1.



Rustic Hanging Basket

Thermometers



No. 5452P, Self-Registering. (Sieve's Pattern.) Copper case; black brass scale, white figures. **Maximum and Minimum.** 8-inch, \$5.50; 10-inch, \$6.50. Magnet with each.

No. 5400. Black japanned heavy tin case; brass scale, white figures. (Mercury.) Scale range, 10 to 40 degrees below zero to 120 above.

Standard Grade. 8-inch, \$1.40; 10-inch, \$1.60.

No. 5420. Black japanned heavy tin case. For greenhouses. Black oxidized brass scale, white figures. (Spirit.) 8-in., 90c.; 10-in., \$1.

No. 5154. Copper case; distance reading. Black oxidized brass scale, white figures. (Spirit.) Scale range, 120 degrees above to 40 degrees below zero. 8-inch, 70 cts.; 10-inch, \$1.

No. 5120. Distance reading. Wood-back Mission finish, brass scale, white figures and graduation. (Spirit.) Easy to read at distance. 8-inch, \$1.25; 10-inch, \$1.50.



Self-Watering Window Box

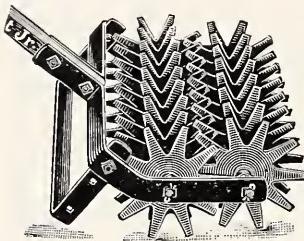
Sundry Requisites



Price,
\$23

No. 25 Planet Junior Combined Hill and Drill Seeder, Double-Wheel Hoe, Cultivator and Plow

This machine is invaluable for two golf purposes: for the construction of a Creeping Bent turf nursery we suggest that the seed be sown in parallel rows 6 inches apart, the rows kept carefully weeded, when at the end of a year a fine mat-like turf will be available; for construction or repair work. Another invaluable use for the Seeder is in the club's vegetable-garden: seeding in straight line, at regular intervals, and at the proper depth are among the essentials for the production of a good supply of high quality vegetables.



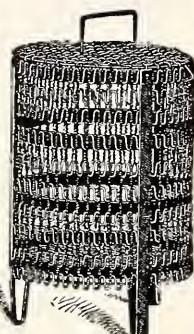
Planet Jr. Star Pulverizer, \$6.50

This new tool is especially adapted for preparing the seedbed, and will be found of great value in smoothing and fining the soil surface. The rear blade is $13\frac{1}{2}$ inches wide. After the crops are started, it may be used between rows as a weeder or as a crust breaker.

Burners for Leaves, Paper and Rubbish

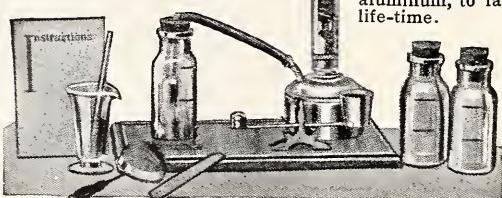
The best receptacle used for burning leaves, papers, and all kinds of rubbish. This handy Burner is a safeguard against many fires that have their origin in the burning of rubbish in the open. The Burner is extra strong, manufactured of heavy galvanized steel wire, reinforced with iron supports. Made to give lifelong satisfaction. We supply this Burner in three sizes.

No.	Diam.	Height	Weight	Each
2	15 in.	24 in.	16 lbs.	\$3 50
2 $\frac{1}{2}$	18 in.	30 in.	22 lbs.	5 25
3	20 in.	35 in.	33 lbs.	7 00



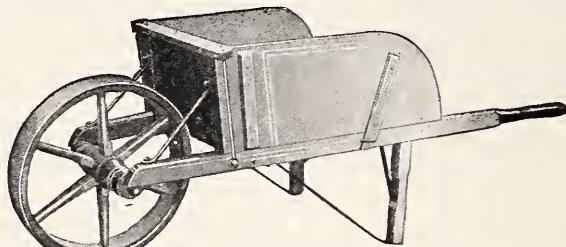
AUTOMATIC.
Any 12-year-old boy can make the tests.
Substantially built from steel, brass, aluminum, to last a life-time.

Soil-Testing Outfit (For Lime)



Enables you to test definitely a soil and determine the correct quantity of lime required. \$10 each.

S. & W. Co.'s Barrow



One of the most useful articles on the list of lawn tools. Materials are selected oak, mortised and bolted together, strengthened with six iron braces. Made substantial, light and for long service. Wheels with 3-inch tread are preferred.

Size	Front	Depth	Length	Rear
	Width			
Medium.....	18 $\frac{1}{2}$ in.	12 in.	26 $\frac{1}{2}$ in.	23 in.
Regular.....	20 in.	12 in.	28 in.	24 in.

Size	Diam.	Tread	Price	Tread	Price
			Box		
Medium.....	20 in.	1 $\frac{1}{2}$ in.	\$7 75	3 in.	\$8 25
Regular.....	22 in.	1 $\frac{1}{2}$ in.	8 75	3 in.	9 25



Stumpf & Walter Co.'s Turf Sweeper

The S. & W. Co.'s Lawn Sweeper is strongly constructed: the brushes consist of hard wearing palmetto. The sweeper is not only indispensable for the putting greens, but may be used with advantage on the lawn, sidewalk or porch.

The machine picks up leaves, sticks and other debris from a swath of 28 inches. It weighs 84 lbs. when in use, with a shipping weight of 106 lbs. Extra wheels, brush-reels, grass boxes and other parts are procurable from us quickly, and this service is simplified if repairs are ordered both by the name and the number when this appears on the part.

The brush-reel carries eight sets of bristles and the reel is geared so that a turn of the drive-wheel revolves them at high speed. An adjusting mechanism enables the operator to set the machine for close or light sweeping. Price, \$27.

Turf Brooms

Birch Brooms. Superior make; long wearing. Complete with handles. 75 cts. each, \$7.50 per doz.

Without handles, 50 cts. each, \$5 per doz.

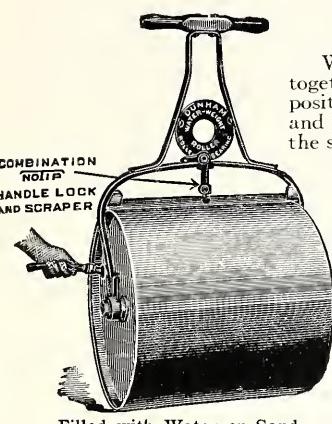
Bamboo Brooms. Very light. Do the work without injury to the grass. Complete with handles. \$2 each, \$20 per doz.

Bamboo Poles. Widely used for sweeping and distributing worm casts. 18 ft., 50 cts. each, \$5 per doz.; 20 ft., 60 cts. each, \$6 per doz.

Rollers

Water-Weight Lawn Rollers

Water-Weight Rollers are most satisfactory. The construction consists of three heavy steel plates, pressed together and electric-welded, forming one solid steel drum with no leaky joints; handles are always in an upright position, as shown in the illustration, and held in this position with counterbalance weights, which also add speed and ease of operation to the Roller. Axles are of high-carbon steel, perfectly round, and revolve in roller bearings, the same as used in automobile construction. This feature alone has proved this Roller to operate with 44 per cent less energy or power than is required to operate other Rollers. The proper way to fill this Roller is shown in the illustration. The weight of each Roller empty and filled is given with the diameter and length below.



Filled with Water or Sand

turning. The best one-man Rollers are those averaging from 250 lbs. to 500 lbs.

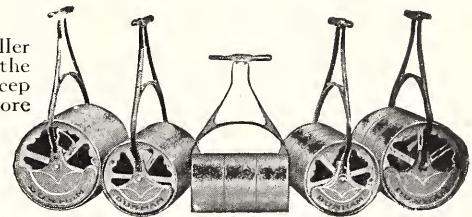
No.	Diam.	Lgt.	Wt.	F.O.B.	F.O.B.	No.	Diam.	Lgt.	Wt.	F.O.B.	F.O.B.
Sec.	in.	in.	lbs.	factory	N. Y.	Sec.	in.	in.	lbs.	factory	N. Y.
1...2...	15...	15...	150...	\$12 00	\$15 25	8...3...	20...	30...	350...	\$27 00	\$35 00
2...3...	15...	22...	200...	16 00	20 00	9...2...	24...	20...	400...	31 00	39 50
4...2...	20...	20...	250...	20 00	25 00	10...2...	24...	24...	450...	34 00	44 00
7...2...	20...	24...	300...	23 00	30 00	13...2...	28...	24...	500...	38 00	49 00

Price

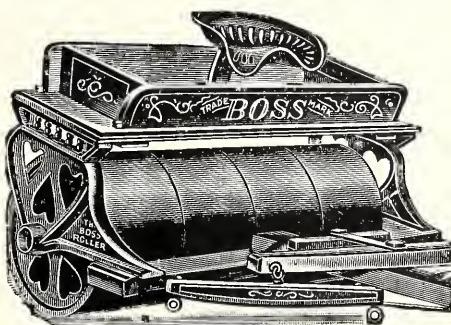
\$17 50
21 00
25 00

Cast-Iron Hand Lawn Rollers

Made in one, two, and three sections. The face of each Roller is made smooth, with outer edges rounded to avoid cutting the turf. Roller-bearing, outside counter-balancing weights to keep the handles in an upright position. The Rollers of two or more sections are preferable, as they will not injure the grass when



Cast-Iron Hand Lawn Rollers



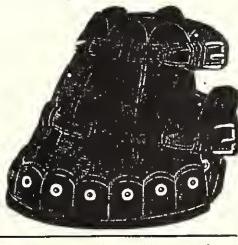
Iron Two-Horse Roller

Suitable for roads, lawns, and golf courses. This Two-Horse Iron Roller is manufactured to do heavy work. Has been used with excellent success on golf courses and private estates, on roads, lawns, and putting-greens. This is the best draft Roller on the market. It has babbitt-metal bearings, pulls directly from the axle, and is so perfectly balanced that there is no weight on the team. It is equipped with a substantial weight box for additional weight, seat, and pole. Each section is turned smooth on the surface with outer edges beveled. This Two-Horse Roller is superior in quality, construction, and finish.

No.	Diameter	Length	Sec.	Weight	F.O.B.	F.O.B.
	in.	in.	in.	lbs.	factory	N. Y.
71...	20 in.	72 in.	6...	1,300 lbs.	\$96 00	\$120 00
72...	24 in.	60 in.	5...	1,450 lbs.	109 00	137 00
73...	24 in.	72 in.	6...	1,700 lbs.	124 00	157 00
75...	28 in.	60 in.	5...	1,650 lbs.	121 00	154 00
76...	28 in.	72 in.	6...	1,950 lbs.	143 00	178 00

Leather Horse Boots, Quality Kind

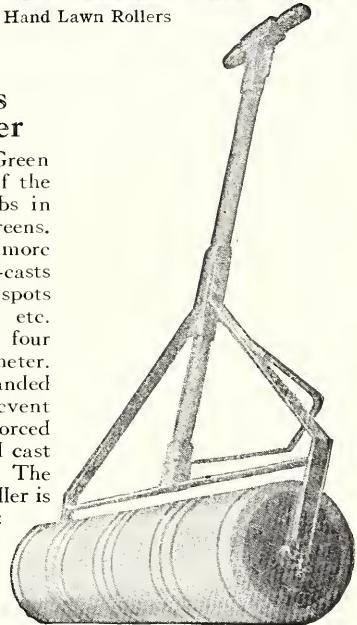
Easily attached to the horse's feet; prevent marring the lawns. Frequently after rains, or in the spring, the lawns are soft and easily cut up. Use a good leather boot and save the lawn. Quality Kind are made good. Double-thick soles and uppers reinforced; heavy parts put together with copper rivets. Small size, \$14; medium size, \$15; large size, \$16 per set of four.



NOTE.—The benefit of a grass seed expert, who has made a life study of this subject, is at your disposal.

The S. & W. Co.'s Putting-Green Roller

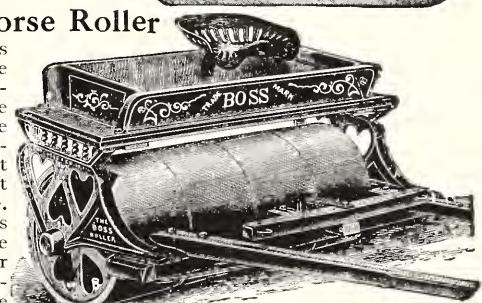
The S. & W. Co.'s Putting-Green Roller is an indispensable part of the equipment required by golf clubs in maintaining perfect putting-greens. This Roller being of wood is more satisfactory for gathering worm-casts and smoothing down all uneven spots caused by frost, worms, ants, etc. The roller is 4 feet wide, having four 12-inch sections, 10 inches in diameter. The ends of each section are banded with 2-inch steel bands, to prevent splitting. The handle is reinforced with steel braces, bolted to solid cast heads on both ends of the roller. The S. & W. Co.'s Putting-Green Roller is endorsed by many of the best golf clubs of America. The net and shipping weight is 186 lbs. \$22.50 each.



Iron One-Horse Roller

This machine is designed to meet the demand for a one-horse Roller. The construction is the same as the two-horse Roller, except that it has the shaft in place of the pole. Each section is turned smooth on the surface with outer edges beveled. Quality and finish are the same as of the two-horse Roller and also include the weight box, seat, and shaft. They give long and excellent service.

No.	Diameter	Length	Sec.	Weight	F.O.B.	F.O.B.
	in.	in.	in.	lbs.	factory	N. Y.
60...	20 in.	48 in.	4...	950 lbs.	\$78 00	\$100 00
61...	20 in.	60 in.	5...	1,150 lbs.	90 00	110 00
62...	24 in.	48 in.	4...	1,200 lbs.	95 00	115 00
63...	24 in.	60 in.	5...	1,450 lbs.	112 00	130 00
65...	28 in.	48 in.	4...	1,350 lbs.	110 00	127 50



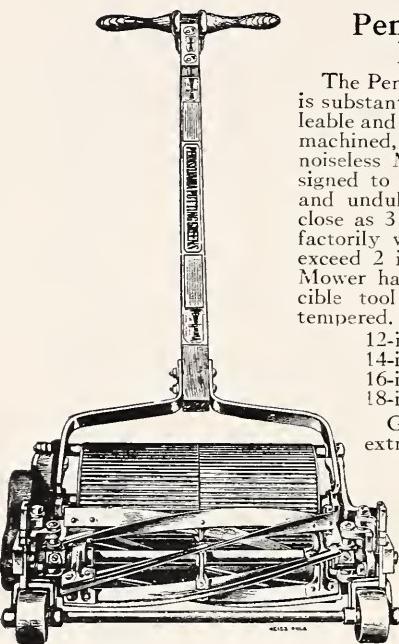
Hand Lawn Mowers

Pennsylvania 7-inch Roller Mower

The Pennsylvania 7-inch Roller Mower is substantially constructed of steel, malleable and cast. The parts are accurately machined, insuring an easy running and noiseless Mower. This machine is designed to cut grass on borders, terraces and undulating greens. It will clip as close as 3-16 of an inch and cuts satisfactorily where grass is not allowed to exceed 2 inches in height. This Roller Mower has six revolving blades of crucible tool steel, oil-hardened and oil-tempered.

12-in. cut.....	\$26 00
14-in. cut.....	30 00
16-in. cut.....	32 00
18-in. cut.....	37 00

Grass Boxes, all sizes, \$8 each, extra.



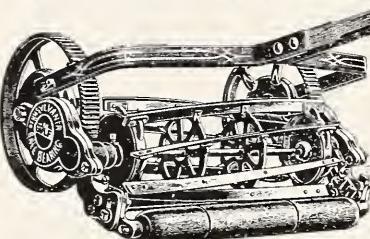
Pennsylvania 7-inch Roller Mower

Pennsylvania Lawn Trimmer Ball-Bearing

Made to meet the demand for a serviceable tool to take the place of grass shears and other devices for cutting grass left at the edge of lawns, fences, walks, etc. Will mow any border wide enough to run one wheel on. High 8-inch wheel; runs easily; self-sharpening.

Width of cut 6 inches; gross weight 26 lbs.; net weight 20 lbs. \$11.50 each.

The Aristocrat Golf Mower Ball-Bearing



The Aristocrat Golf Ball-Bearing

be obtained from a Golf Mower. The life of this Mower is long compared with the other styles of Golf Mowers. The seven revolving blades and the bottom knife are the best crucible tool-steel, oil-tempered and water hardened. A double train of gears drives the

revolving blades from two 9½-inch traction wheels. The greens are shaved to $\frac{1}{16}$ of an inch and left even and smooth. The Aristocrat is ball-bearing, runs easily, and does not jump when starting.

Considerable weight of the Mower is carried by the sectional iron roller, which rolls the worm-casts and assists in keeping the green true and even. Wherever the Aristocrat has been given a thorough test, it has been accepted and given the preference. The illustration with the Grass-Box



The Aristocrat with Grass Box Attached

attached shows the Aristocrat complete, and the way it should be operated to obtain the best results.

The Aristocrat is used exclusively and highly recommended by many of the best golf, tennis and cricket clubs.

Size	Gross weight	Net weight	Price	Grass Box
17-inch cut.....	102 lbs.....	72 lbs.....	\$33 00	\$8 00
19-inch cut.....	104 lbs.....	76 lbs.....	37 00	8 00

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Size	Gross weight	Net weight	Price	Grass Box
17-inch cut.....	102 lbs.....	72 lbs.....	\$33 00	\$8 00
19-inch cut.....	104 lbs.....	76 lbs.....	37 00	8 00

S. & W. Co.'s Ball-Bearing Mower

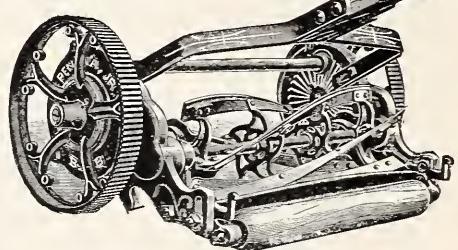
A high-grade standard machine, adopting only the best features in its construction. The cutting parts are made of oil-hardened water-tempered crucible tool-steel, and are positively self-sharpening. The knives and blade will hold a durable edge and will not dull as the softer cutting parts of other Mowers do. The simple adjustment sets the machine to shave the lawn to $\frac{1}{2}$ -inch or up to $1\frac{1}{2}$ inches as may be desired. The axle revolves in extra-large balls placed in hardened tool-steel cones and cups, and is driven with two gears by two 10-inch traction wheels. These wheels are made durable and are not easily broken.

This Lawn Mower is made to give good and long service and with ordinary good care will last from five to ten years. We take the liberty to recommend the S. & W. Co.'s Ball-Bearing Lawn Mower to be the best all-round Lawn Mower of its type manufactured. We guarantee it to give entire satisfaction.

Size	Gross weight	Net weight	Price	Grass Catcher
14-inch cut.....	65 lbs.....	40 lbs.....	\$15 00	\$4 75
16-inch cut.....	67 lbs.....	42 lbs.....	16 50	4 75
18-inch cut.....	71 lbs.....	45 lbs.....	18 00	5 25
20-inch cut.....	76 lbs.....	48 lbs.....	20 00	6 00

Pennsylvania Junior Ball-Bearing

Has all the good features incorporated in a perfect Lawn Mower. The five revolving blades are driven by a triple set of gears and a 10-inch traction wheel from each side. The revolving blades and the bottom knife are the best crucible tool-steel, oil-tempered and water-hardened. The Pennsylvania Junior is capable of cutting grass 6 inches high. Will not jump, as many of the lower-priced machines do.



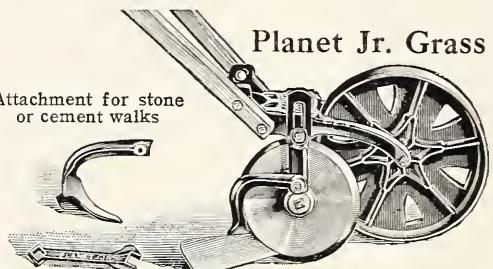
Pennsylvania Junior Ball-Bearing

Size Gross weight Net weight Price Grass Catcher

15-inch cut.....	71 lbs.....	48 lbs.....	\$27 50	\$4 75
17-inch cut.....	74 lbs.....	51 lbs.....	31 00	4 75
19-inch cut.....	77 lbs.....	53 lbs.....	35 00	5 25
21-inch cut.....	80 lbs.....	55 lbs.....	38 50	6 00

Planet Jr. Grass Edger

Attachment for stone or cement walks



Trims the turf around the edges of the flower-beds, walks, etc., giving a finished appearance to the lawn. Complete, \$6.50 each.

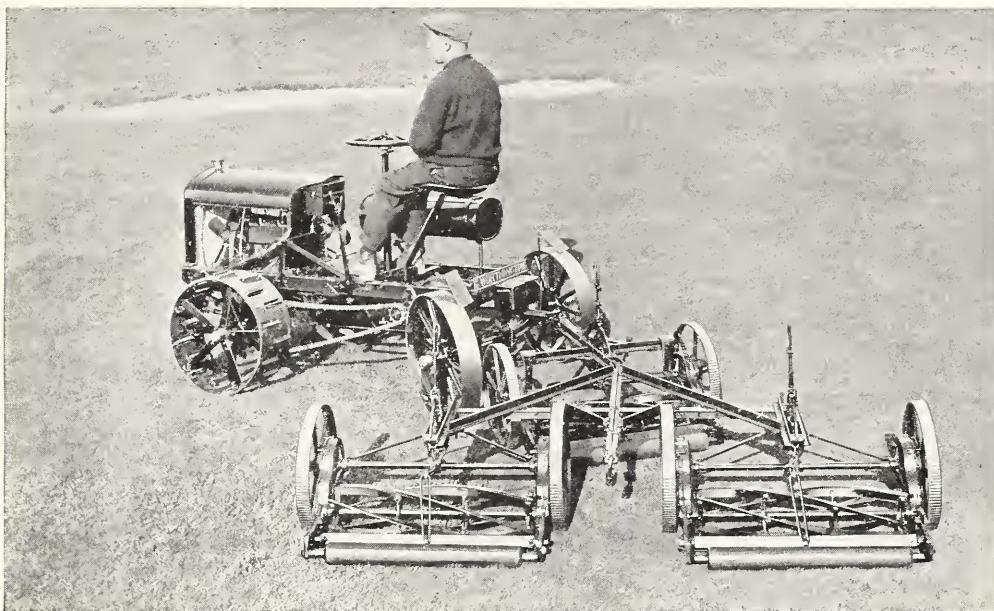


Solid Welded Steel Edging. Socket handle; made of the very best steel; imported English. 8-inch, \$2.50 each; 9-inch, \$3 each.

Half-Moon. Solid steel, with a polished handle. \$1 each. Without handle, 75 cts. each.

Vegetables and Flowers for the Club House

We suggest that you grow your own Vegetables and Flowers. Together with good land, well handled, the best possible seeds are essential. We list these in our illustrated catalogue, a copy of which will be gladly sent on request.



The Use of a Tractor in Combination with a Gang Mower. The Shawnee Triple Mower with Worthington Tractor

COMBINATION SHAWNEE TRIPLE MOWER and WORTHINGTON LAWN TRACTOR

IMPROVES THE TURF. DISPLACES THE HORSE
REDUCES THE EXPENSE OF CUTTING UPKEEP MORE THAN ONE-HALF

Some of the Golf Courses Now Using the Worthington Tractor

NEW JERSEY

Canoe Brook Country Club, Summit
Deal Golf Club, Deal
Englewood Golf Club, Englewood
Essex County Country Club, West Orange
Hackensack Golf Club, Hackensack
Knickerbocker Country Club, Tenafly
Morris County Golf Club, Convent Station
Maplewood Country Club, Maplewood
Ridgewood Country Club, Ridgewood
Rumson Country Club, Rumson
Somerset Hills Golf Club, Bernardsville
Shackamaxon Country Club, Westfield
Trenton Country Club, Trenton
Upper Montclair Country Club, Upper Montclair
Yountakah Country Club, Nutley

NEW YORK

Dutchess Golf and Country Club, Poughkeepsie
Gedney Farms Club, White Plains
Links Golf Club, East Williston
Mt. Kisco Country Club, Mt. Kisco
National Golf Links, Southampton, Long Island
North Shore Golf Club, Glen Head, Long Island
Oakland Golf Club, Bayside, Long Island
Oneonta Country Club, Oneonta
Piping Rock Club, Locust Valley, Long Island
Port Jervis Country Club, Port Jervis
St. Andrews Golf Club, Mt. Hope

PENNSYLVANIA

Northampton Country Club, Easton
Philadelphia Country Club, Philadelphia
Torresdale Golf Club, Torresdale
Tredyffrin Golf Club, Paoli
White March Valley Country Club, Chestnut Hill

Write for Descriptive Literature

PRICES

Triple Mower	\$350.00
(Sulky Model—All Steel Frame)	
Worthington Tractor .	\$1000.00
Both Together	1325.00
	(F. O. B. Factory in Penna.)

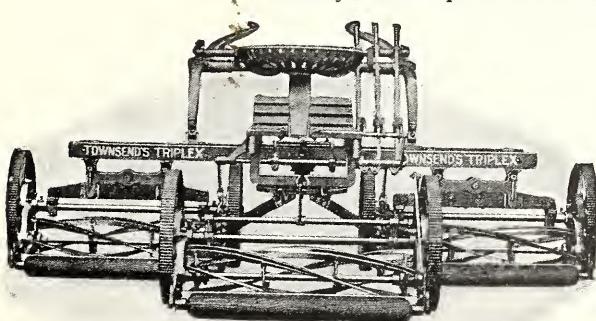
What the invention of the harvester and reaper meant years ago to the grain-fields of the world, the introduction of the Shawnee Mower and Worthington Tractor means to the lawns of America today.

Townsend's Triplex Lawn Mower

This Triplex is much lighter than the ordinary horse lawn mower, but cuts three times as wide a swath. One man and one horse, with a Triplex, will cut more grass in a day than three men and three horses with three ordinary horse lawn mowers, thus saving the wages of two men, the cost of two horses, and the cost of their care and keep.

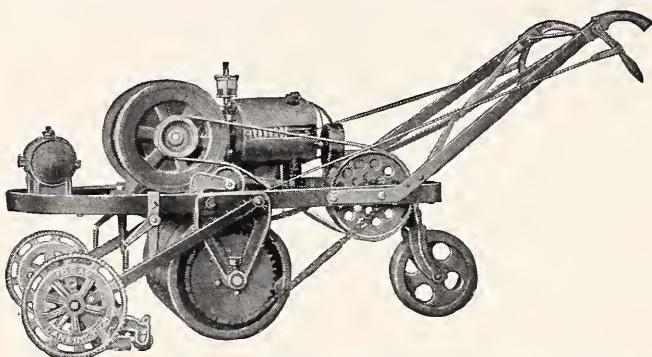
Here is a mower that will cut a swath 86 inches wide. It floats over the uneven ground as a ship rides the waves. One mower may be climbing a knoll, a second may be skimming the level, and a third may be paring a hollow.

Price, \$375, f. o. b. factory. Weight 600 pounds. Extra Unit, \$100, f. o. b. factory.



Townsend's Triplex Lawn Mower

FINE LAWNS KEPT FINE WITH THE IDEAL



The practicability of the Ideal Power Lawn Mower is proven by the many letters of recommendation received from its users.

Mechanism so Simple Anyone Can Operate It

Simplicity is its dominating feature. The machine has few parts, and the entire absence of intricate mechanism makes it as near fool-proof as is possible in a machine of this kind. No experienced operator is required—anyone who can keep a gasoline motor supplied with gasoline and oil can operate an Ideal Power Mower. Owing to its simplicity and few parts, it seldom gets out of order.

Cutter Is Pulled Instead of Driven Direct

Experience has shown that the type of Mower in which the cutting reel is driven direct from the engine by means of sprockets and chain, and the Mower built rigidly into the frame of the tractor, is not practicable for the reason that obstacles on the lawn are picked up by the reel, which, being positively driven, causes constant breakage.

The principle of the Ideal Power Lawn Mower is the same as that of the ordinary hand Mower. The cutting reel is driven by the traction of the Mower wheel. The Mower is loosely suspended from the frame of the tractor, and becomes the front axle of the machine. It is pivoted so that it always has a free tilting motion, and the wheels adapt themselves to any irregularity of the ground's surface. The Mower, therefore, glides over the lawn, and any obstruction which may be encountered merely prevents the blades from rotating and the wheels slip over the ground with no possible chance for breakage. This means added life to the entire outfit.

The driving roller is made up of three separate castings. The center roller is keyed to the shaft. The two outer rollers run loose on the shaft and are driven by the center roller which allows them to have a complete turn before engaging with the center drive roller. This feature facilitates turning, as in turning the outside roller is always free to run ahead of the driver.

Guarantee

The material and workmanship are guaranteed first class in every respect; and any part proving defective within one year from date of shipment will be replaced free of charge if returned, charges prepaid, for inspection; but under no circumstances will we allow for cost of labor and other expenses in making replacement.

The Sturdy, Dependable, Fool-Proof Ideal Motor

The power unit for the Ideal Power Lawn Mower has been designed especially for the use to which it is put. It is a slow-speed, single cylinder motor with hit-and-miss governor, and

Clubs Using Ideal Mowers:

MALBA FIELD CLUB,

Malba, L. I.

ALLEGHENY COUNTRY CLUB,

Pittsburgh, Pa.

BELVEDERE COUNTRY AND

GOLF CLUB, Belvedere, Calif.

CRESCENT ATHLETIC CLUB,

Brooklyn, N. Y.

WITHUNET GOLF CLUB,

Kennibunk Beach, Me.

ROCKAWAY RIVER CLUB,

Denville, N. J.

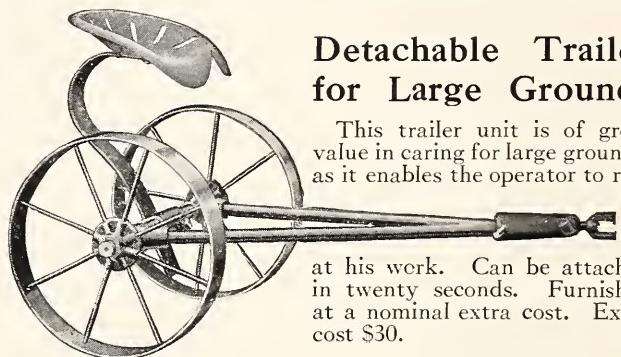
and many others.

jump spark ignition, operating on dry cells instead of magneto, in short, the logical motor for this class of work—a motor that eliminates the troubles that would surely result in operating a more complicated motor. The excessive vibration of high-speed engines makes them unsuited to this duty, and the motor employing a magneto is undesirable as it requires the attention of a skilled operator.

This Ideal Motor is built with just as few parts as are possible. Because of its simple and durable construction, it can be depended upon faithfully to perform its work, giving maximum service with a minimum of attention and expense.

Specifications

Width cut.....	30 in.	Shipping weight.....	735 lbs.
Speed per hour.....	2 $\frac{3}{4}$ miles	Width Roller.....	24 in.
Diameter Roller.....	14 in.	Will cut, allowing 2-in. lap,	
Diameter Cutting Reel....	6 in.	3/4 acre per hour	
Face Mower Wheels....	18 $\frac{3}{4}$ in.	Diameter Mower Wheels	11 in.
Actual weight.....	550 lbs.	Number of Cutting Blades.....	5



Detachable Trailer for Large Grounds

This trailer unit is of great value in caring for large grounds, as it enables the operator to ride

at his work. Can be attached in twenty seconds. Furnished at a nominal extra cost. Extra cost \$30.

A Simple and Practical Power Mower

Price \$360, f. o. b. your station. Sulky or riding attachment, \$30 extra. Extra Cutting Unit, \$60 each. Putting-Green Cutting Unit, \$65 extra.

Ideal Junior Lawn Mower

In addition to the regular 30-inch model, there is also an Ideal "Junior" having a 22-inch cutting blade. This "Junior" is of the same general style and construction as the large model, the only difference being in its lighter weight, smaller size, and smaller capacity. The "Junior" is recommended for use on small grounds, and as an auxiliary to the 30-inch model on large grounds.

Price of "Junior" Mower, \$240. Extra 22-inch Cutting Unit \$45. Extra 18-inch Putting-Green Cutter for the above outfit, \$55 delivered to your station.

Rubber Hose and Sprinklers

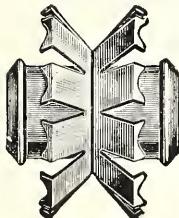
A Special Brand of Hose for Golf

Golf Course. Four-ply heavy duck Hose, with exceptionally strong black tube and white cover. Especially adapted for use on golf courses, tennis-courts, and cricket-creases. This is guaranteed for any pressure and hard work as usually found on golf courses and private estates. Will stand up and give satisfaction under conditions where ordinary garden Hose has failed. Standard lengths, $\frac{3}{4}$ -inch bore, 25 ft., \$6.50; 50 ft., \$12. Standard lengths, 1-inch bore, 25 ft., \$9; 50 ft., \$17.

A Cheaper Grade of Hose

RELIABLE IN EVERY WAY

S. & W. Co.'s Special Brand (Wayahead). Surpasses all the cheaper grades of Hose. Its durability is not excelled by much of the higher-priced Hose. It is three-ply, seamless, and non-kinkable. Standard lengths, $\frac{3}{4}$ -inch bore, 25 ft., \$4.50; 50 ft., \$8.50.



Hose Menders

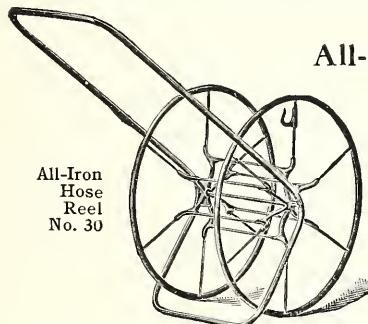
Cooper's Brass. $\frac{1}{2}$ - and $\frac{3}{4}$ -inch, 12 cts. each, \$1.20 per doz.; 1-in., 15 cts. ea., \$1.70 per doz.

Perfect Clincher. $\frac{1}{2}$ - or $\frac{3}{4}$ -inch, 20 cts. each, \$2 per doz.

Hudson. $\frac{1}{2}$ - or $\frac{3}{4}$ -inch; state size. Box of 6 tubes and 20 bands, with pliers, \$1.

Sykes Hose Holder

A simple and inexpensive device for holding the hose. With this the nozzle can be placed at almost any angle. 35 cts



All-Iron
Hose
Reel
No. 30

All-Iron Hose Reel

The All-Iron Hose Reels are constructed entirely of iron, and are indestructible. They are light in weight, frictionless, and the wheels being high, they are easily manipulated. These Reels cannot tip over when unreeling and there is no weight on the handle.

No. 10, 21-in. wheel, holds 100 feet $\frac{3}{4}$ -in. hose, \$5 each. No. 20, 24-in. wheel, holds 150 feet $\frac{3}{4}$ -in. hose, \$5.50.

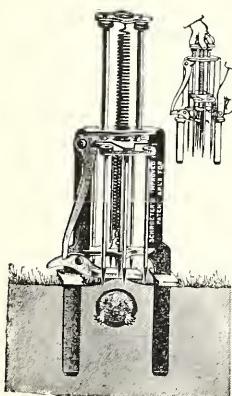
No. 30, 30-in. wheel, holds 500 feet $\frac{3}{4}$ -in. hose, \$9 each.

Mole Traps

Schroeder Improved No. 1. It has a rest on top for a weight, also eight sharp prongs and a strong spiral spring. \$2 each, \$20 per doz.

The Rittenhouse. The simplest, safest, and surest mole trap ever invented. Self-setting. No danger of its going off unless the trigger is touched. Made of all steel and tinned. Six in a crate. The spears are spring steel, therefore not so long as soft steel. \$1.10 each, \$11 per doz.

Reddick's. \$1.25 each, \$12 per doz.



Schroeder Improved



Rittenhouse

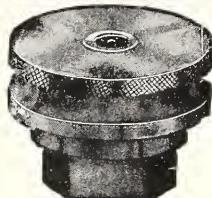
MO-LO Will Clear Your Lawn of Moles and Field Mice in a Few Nights

Directions:—Punch a hole in top of run, drop in one MO-LO and cover lightly. Do this every eight or ten feet. Keep MO-LO away from children or domestic animals. It is poisonous. Package, 25 cts.

Hose Nozzles

Stott's. A Nozzle that has become a favorite among rose-growers, etc., for exterminating red spider. Splendid Nozzle for reaching under the foliage; gives a very fine, misty spray. Single, \$1.50, double, \$3.

Mistry Jr. Can be used for spraying whitewash. \$1.75 each.



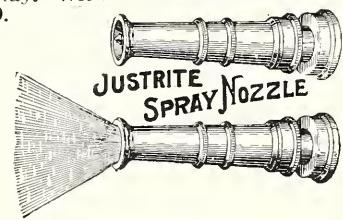
Mistry Jr. Nozzle

Magic. Brass Hose Nozzle, $\frac{3}{4}$ -inch. Has a shut-off, a stream, and a rose spray. Without rose, \$1.20, with rose, \$1.50.

No. 191. The most efficient and simplest in construction of any shut-off Nozzle. Has fewer parts and is less liable to get out of order. \$1.50.

Justrite Spray. A very popular adjustable Nozzle. It gives a copious spray or a well-defined full stream. Has a positive shut-off, by turning the barrel of the nozzle. 90 cts. each.

Bordeaux Spray Nozzle. A good nozzle for whitewash and all heavy spray materials. \$1.50.



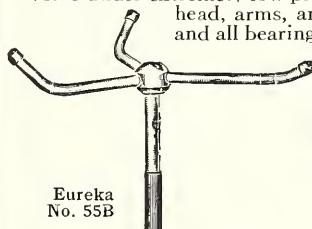
Hose Couplings

Lightning. $\frac{3}{4}$ -inch, 50 cts. each.

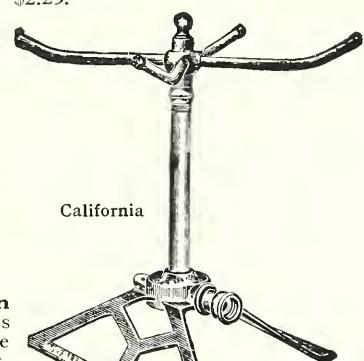
Regular. $\frac{1}{2}$ -inch, 25 cts.; $\frac{3}{4}$ -inch, 30 cts. each.

Lawn Sprinklers

Eureka No. 55B Lawn Sprinkler. The Eureka Sprinkler will revolve under extremely low pressure, and is a first-rate article. The head, arms, and upper stem are nickel-plated brass and all bearing parts of the Eureka are of brass. The base is japanned black and has a loose swivel. Height, 10 inches. \$2.25.



Eureka
No. 55B

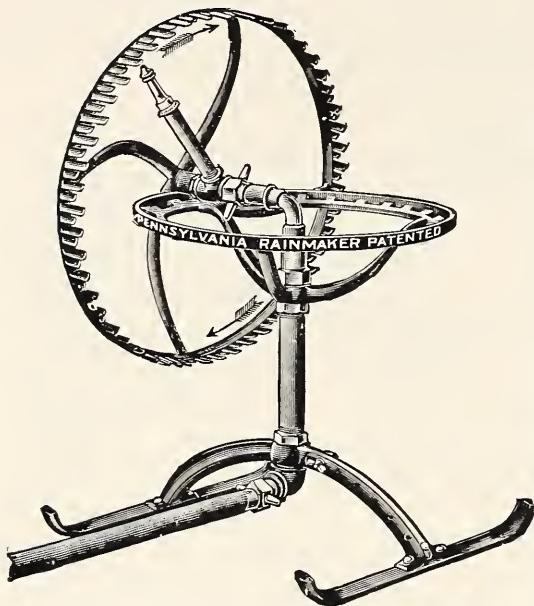


California

California Lawn Sprinkler. Is made with three and four arms. Arms and head are polished brass. Attached to a sled base, 10 inches square. Can be readily drawn about the lawn and will not upset. With 4 arms, \$2.50. With 3 arms, \$2.

Maid-of-the-Mist Sprinkler. An effective device for sprinkling lawns, gardens, or flower-beds. The water flows with unimpeded force, and is divided and deflected by the two lips of the swivel piece, which it causes to revolve rapidly, scattering the water in fine drops and evenly over a circular area of 25 feet. It works more satisfactorily with a very low pressure of water than any Sprinkler we know of. With spur, \$1.25, mailed 10 cts. extra. With sled (recommended) \$1.75.

There is a difference in seeds, in spite of the fact that mostly they look alike. Your interests are carefully taken care of when you purchase from the Stumpf & Walter Co.

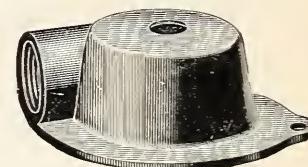


Rainmaker Sprinkler

This Sprinkler waters an area of 300 to 500 square yards with drops of spray; doesn't flood; doesn't swamp at the center; doesn't wash out soil; doesn't chill tender grass or plants; and works without attention.

It is made on the turbine principle. The water coming from the nozzle strikes the turbine paddles, turning the wheel. As the turbine wheel revolves it travels around the circular base, carrying the jet around approximately eight times a minute. It distributes the water evenly over the entire area so gradually that it allows it to sink into the ground and not run off into low places.

The Rainmaker can be easily regulated to throw heavy or medium drops, or fine spray. With a pressure of 40 to 60 pounds it will distribute this evenly from the center to the extreme edge of a circular area 60 to 75 feet in diameter. Most of the spray travels through the air much further than is true of all other Sprinklers. That gives it time to lose the chill so harmful to plants. \$25 ea. Three for \$23.75 ea.



C. B. G. Sprinkler

The C. B. G. Sprinkler (Cheap but Good)

Is made on the well-known principle of the tangential spray. Nothing to get out of order. Will last a lifetime. It is easily drawn about the lawn without shutting off the water. 60c. ea., \$6 per doz.

The Campbell Waterfan Oscillating Irrigator

The Campbell Waterfan Oscillating Irrigator consists of a light but very substantial and rigid steel frame on one end of which is mounted a water motor which is attached to and actuates a distributing pipe which is secured to the top of the frame and along one side of which is inserted a line of small brass discharge jets.

The frame is about 21 inches long, 8 inches wide, and supports the pipe about 7 inches high. The supporting skids are curved at each end to prevent sticking in soft soil or damaging turf, and enable the machine to be very easily moved from place to place. The frame is either galvanized with an aluminum finish or enameled battleship gray. The motor is of a greatly improved type, very carefully constructed, with all wearing parts of non-corrosive material and with ordinary care will last for years. The distributing pipe is made of heavy brass tubing.

The distributing jets now used are also an improved type, carefully reamed and finished, and will throw a fine, straight stream 10 to 15 feet before the water begins to break up. These jets are placed at such an angle that the plane of water

discharged gradually widens and by the time it has reached a distance of 25 to 30 feet covers a strip 12 to 14 feet wide.

When in operation, the motor, actuated by water passing through it, oscillates the discharge pipe so that the streams, which, as above explained, spread out to a width up to 14 feet, and are thrown from a 45-degree position on one side over the machine to a 45-degree position on the other, thus covering an area up to 60 feet long and 14 feet wide, or, if desired, simply by loosening a thumb nut, the stroke can be shortened and the pipe set so that the distribution will be from a 45-degree to a vertical position, thus covering a space up to 30 x 14 feet on one side of the machine only.

The Waterfan is suitable for miniature courses or clock greens.

WATERFAN. Model No. 5.

Length, 21 in.; weight, 5 lbs. Waters a rectangular area up to 12 x 60 ft. \$15 each.

WATERFAN GIANT. Model No. 10.

Length, 5 ft.; weight, 10 lbs. Waters a rectangular area up to 20 x 60 ft. \$25 each. F.O.B. New York.

Watering Pots

Heavy galvanized iron, reinforced; made well and substantially. Each pot has a long spout, with one fine and one coarse rose.

Round Pattern.

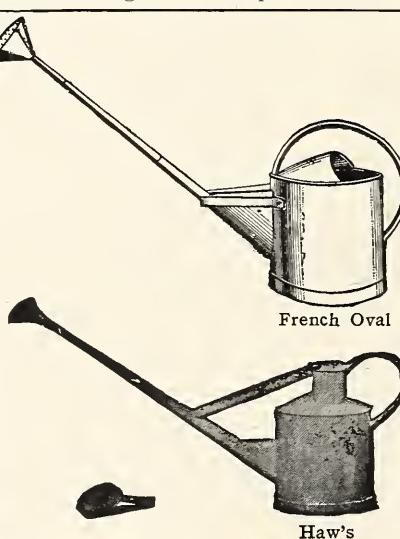
6-quart.....	\$4 75
8-quart.....	5 00
10-quart.....	5 50
12-quart.....	6 00

French Oval Pattern.

6-quart.....	\$5 50
8-quart.....	6 00
10-quart.....	6 25
12-quart.....	7 00

Haw's Pattern.

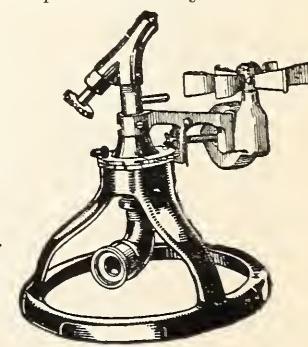
Ladies', 2-quart ..	\$3 75
No. 1, 3-quart....	5 00
No. 2, 4-quart....	6 00
No. 3, 6-quart....	7 00
No. 4, 8-quart....	8 00
No. 5, 10-quart...	9 00



The Dayton Rotary and Oscillating Sprinkler

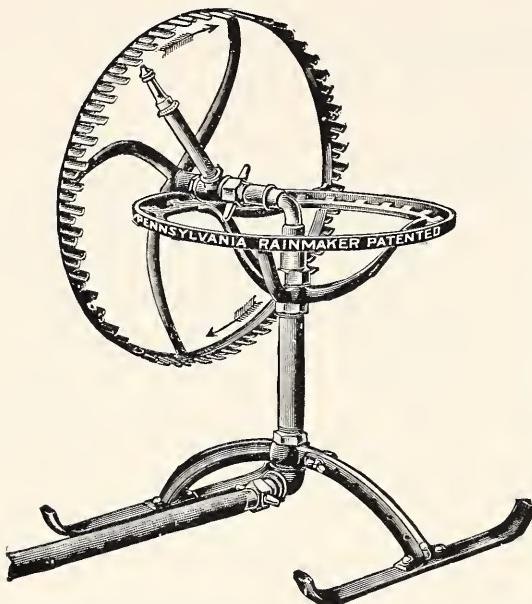
The Dayton is the most practical, durable, efficient Sprinkler devised for watering putting greens and is now being used by thousands of lovers of a beautiful lawn or garden. It sprinkles in a circle. It sprinkles in a half-circle. It sprinkles from a 3-foot radius to a 40-foot radius. It sprinkles every inch of ground. It is better for your lawn or plants than sprinkling with a hose. It operates on any pressure from 15 pounds up. The nozzle can be adjusted to any kind of a stream. It pays for itself in water saved and convenience. It is made of the best brass, aluminum, and German silver. \$6.

NOTE.—THE BENEFIT OF A GRASS SEED EXPERT, WHO HAS MADE A LIFE STUDY OF THIS SUBJECT, IS AT YOUR DISPOSAL.



*AND he gave it for his opinion,
that whoever could make two ears
of corn, or two blades of grass, to grow
upon a spot of ground where only one
grew before, would deserve better of
mankind, and do more essential service
to his country than the whole race of
philosophers put together."*

—JONATHAN SWIFT.



Rainmaker Sprinkler

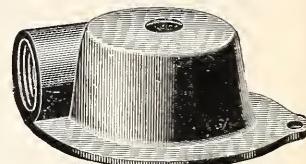
This Sprinkler waters an area of 300 to 500 square yards with drops of spray; doesn't flood; doesn't swamp at the center; doesn't wash out soil; doesn't chill tender grass or plants; and works without attention.

It is made on the turbine principle. The water coming from the nozzle strikes the turbine paddles, turning the wheel. As the turbine wheel revolves it travels around the circular base, carrying the jet around approximately eight times a minute. It distributes the water evenly over the entire area so gradually that it allows it to sink into the ground and not run off into low places.

The Rainmaker can be easily regulated to throw heavy or medium drops, or fine spray. With a pressure of 40 to 60 pounds it will distribute this evenly from the center to the extreme edge of a circular area 60 to 75 feet in diameter. Most of the spray travels through the air much further than is true of all other Sprinklers. That gives it time to lose the chill so harmful to plants. \$25 ea. Three for \$23.75 ea.

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Is made on the well-known principle of the tangential spray. Nothing to get out of order. Will last a lifetime. It is easily drawn about the lawn without shutting off the water. 60c. ea., \$6 per doz.



C. B. G. Sprinkler

The Campbell Waterfan Oscillating Irrigator

The Campbell Waterfan Oscillating Irrigator consists of a light but very substantial and rigid steel frame on one end of which is mounted a water motor which is attached to and actuates a distributing pipe which is secured to the top of the frame and along one side of which is inserted a line of small brass discharge jets.

The frame is about 21 inches long, 8 inches wide, and supports the pipe about 7 inches high. The supporting skids are curved at each end to prevent sticking in soft soil or damaging turf, and enable the machine to be very easily moved from place to place. The frame is either galvanized with an aluminum finish or enameled battleship gray. The motor is of a greatly improved type, very carefully constructed, with all wearing parts of non-corrosive material and with ordinary care will last for years. The distributing pipe is made of heavy brass tubing.

The distributing jets now used are also an improved type, carefully reamed and finished, and will throw a fine, straight stream 10 to 15 feet before the water begins to break up. These jets are placed at such an angle that the plane of water

discharged gradually widens and by the time it has reached a distance of 25 to 30 feet covers a strip 12 to 14 feet wide.

When in operation, the motor, actuated by water passing through it, oscillates the discharge pipe so that the streams, which, as above explained, spread out to a width up to 14 feet, and are thrown from a 45-degree position on one side over the machine to a 45-degree position on the other, thus covering an area up to 60 feet long and 14 feet wide, or, if desired, simply by loosening a thumb nut, the stroke can be shortened and the pipe set so that the distribution will be from a 45-degree to a vertical position, thus covering a space up to 30 x 14 feet on one side of the machine only.

The Waterfan is suitable for miniature courses or clock greens.

WATERFAN. Model No. 5.

Length, 21 in.; weight, 5 lbs. Waters a rectangular area up to 12 x 60 ft. \$15 each.

WATERFAN GIANT. Model No. 10.

Length, 5 ft.; weight, 10 lbs. Waters a rectangular area up to 20 x 60 ft. \$25 each. F.O.B. New York.

Watering Pots

Heavy galvanized iron, reinforced; made well and substantially. Each pot has a long spout, with one fine and one coarse rose.

Round Pattern.

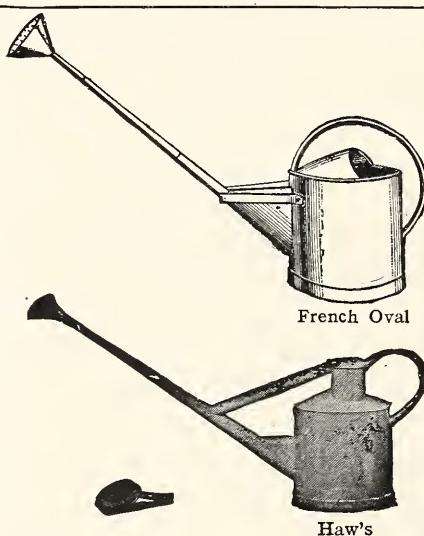
6-quart.....	\$4.75
8-quart.....	5.00
10-quart.....	5.50
12-quart.....	6.00

French Oval Pattern.

6-quart.....	\$5.50
8-quart.....	6.00
10-quart.....	6.25
12-quart.....	7.00

Haw's Pattern.

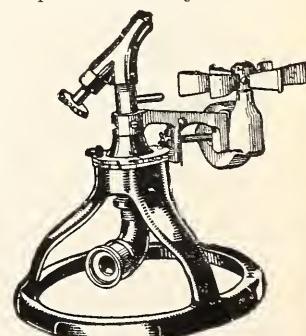
Ladies', 2-quart .	\$3.75
No. 1, 3-quart....	5.00
No. 2, 4-quart....	6.00
No. 3, 6-quart....	7.00
No. 4, 8-quart....	8.00
No. 5, 10-quart...	9.00



The Dayton Rotary and Oscillating Sprinkler

The Dayton is the most practical, durable, efficient Sprinkler devised for watering putting greens and is now being used by thousands of lovers of a beautiful lawn or garden. It sprinkles in a circle. It sprinkles in a half-circle. It sprinkles from a 3-foot radius to a 40-foot radius. It sprinkles every inch of ground. It is better for your lawn or plants than sprinkling with a hose. It operates on any pressure from 15 pounds up. The nozzle can be adjusted to any kind of a stream. It pays for itself in water saved and convenience. It is made of the best brass, aluminum, and German silver. \$6.

NOTE.—THE BENEFIT OF A GRASS SEED EXPERT, WHO HAS MADE A LIFE STUDY OF THIS SUBJECT, IS AT YOUR DISPOSAL.



Stumpp & Walter Company's Ready Reference Formulae for Greenkeepers

FERTILIZERS AND MANURES

MATERIAL	WHY IT IS USED	WHEN IT IS USED	TYPICAL ANALYSES (Subject to variation) Ammonia, phosphoric acid, potash	WHAT MAY HAPPEN IF TOO MUCH IS USED	HOW MUCH MAY BE USED						PRICE (Subject to change without notice)			
					When preparing new land for grass			For top-dressing existing turf			100 lbs. F.O.B. New York	500 lbs. F.O.B. New York	2000 lbs. (Ton) F.O.B. New York	Per ton (2000 lbs.) In carload lots F.O.B. shipping point
Lbs.	Lbs.	Square Yard	Lbs.	Lbs.	Square Yard									
(a) CHEMICAL FERTILIZERS														
*Bone Meal	Adds nitrogen, phosphoric acid, and lime to the soil. Is slow-acting and lasting; a splendid grass-food, but has the reputation of encouraging into growth any seeds of White Clover that may be in the land.	Any time.	3-24-0	The soil may become sour; grubs, earthworms, and other forms of life encouraged, and fungous growths developed.	1500	150	5 ozs.	750	75	2½ ozs.	\$4.50	\$17.50	\$60.00	\$50.00
Basic Slag (Thomas' Phosphate Slag)	Contributes phosphoric acid and lime. Is slow-acting.	Fall and winter.	0-16-0	Safe to use, but if applied too freely tends to encourage clover.	2000	200	6 ozs.	1000	100	3 ozs.	Price on application.			
Stumpp & Walter Co.'s Fairgreen Fertilizer	Adds to the soil the element required by grass. Although quick to act, its effect is spread over one or two years.	Spring, summer, or early fall.	0-15-0	An excess may burn the grass temporarily, but quite safe when used in the quantities indicated.	1500	...	5 ozs.	750	...	2½ ozs.	4.50	15.00	50.00	45.00
Stumpp & Walter Co.'s Fertilizing Meal. (For top-dressing)	Nurses along grass that has been newly sown; nourishes and protects it during the most critical period of its existence.	Spring, summer, or early fall.	6-3-½	Cannot harm the young grass unless applied greatly in excess of the proportions suggested.	...	...	...	2000	200	6 ozs.	6.25	27.50	90.00	80.00
*Stumpp & Walter Co.'s Emerald Grass Fertilizer. (For Putting-greens)	A well-balanced formula, designed to feed only the finer grasses, and to keep them in a fine, healthy condition.	Spring, summer, or early fall.	4-6-0	Used with ordinary care, it will not damage existing grass in any way. We advise always that it be mixed with twice its bulk of top-soil, sand or humus.	1500	150	5 ozs.	750	75	2½ ozs.	5.50	20.00	70.00	60.00
*Stumpp & Walter Co.'s Anti-Clover Manure	Supplies food to the grass plants only; these are encouraged and they flourish, while clover is eventually crowded out. Frequent dressings are advised.	Spring, summer, or early fall.	6½-12-0	The above remarks apply. Should the upper leaves of the grass plants be scorched through using quantities in excess of those suggested, the turf will quickly recover; no permanent damage is likely.	1500	150	5 ozs.	750	75	2½ ozs.	6.00	25.00	80.00	70.00
Lime, Hydrated	Lime is a plant food, and, further, it liberates other foods in the soil. It also corrects acid conditions in the soil. Lime is of use for binding loose soils, while, curiously enough, it also opens heavy land.	Any time.	70% calcium	In excess, plant-food may be liberated too quickly and be lost with drainage-water. Further, too much lime on soil which does not really need it will destroy vegetable matter that forms part of the soil and render the whole area sterile.	2000 to 6000	200 to 600	6 ozs. to 20 ozs.	500 to 3000	50 to 300	1½ ozs. to 10 ozs.	2.00	8.75	30.00	20.00
Limestone, Pulverized	The above remarks apply, but Pulverized Limestone is slower to act.	Any time.	60% calcium	The above remarks apply.	2000 to 8000	200 to 800	6 ozs. to 25 ozs.	500 to 3000	50 to 300	1½ ozs. to 10 ozs.	2.00	7.00	20.00	15.00
*Nitrate of Soda	Adds nitrogen, but in such a form that the grass plants can take immediate advantage of it. It is best to regard nitrate of soda as a stimulant merely, and its use is recommended only in limited quantities.	Spring to late summer.	18-0-0	It is quite easy to damage seriously a turf with Nitrate of Soda. The results from a single dressing are frequently so marked and so quick that there is a temptation to use it too freely. We advise that no more than two dressings be given in any one season; do not force the grass.	...	...	...	500	50	1½ ozs.	5.00	22.50	80.00	72.50
Phosphate, High-Grade Acid or Rock	Adds phosphoric acid and small quantities of lime. Splendid for soils showing an alkaline reaction.	Late winter, spring or early summer.	0-16-0	An excess will sour the soil, and if continued dressings be given it may render the soil sterile.	1000	100	3 ozs.	500	50	1½ ozs.	3.00	12.50	40.00	30.00
Soot, Scotch (Imported)	The usual impurities of Soot are splendid plant-foods, and its use is invariably followed by a luxuriant dark green turf. It also discourages soil-pests, such as grubs, wireworms, cut-worms, and earthworms.	Spring, summer, or fall.	3½-0-0	An excess may smother the grass or choke it. Further, dressings in excess of those indicated by us are likely to take some time before they disappear; in the meanwhile, they are unsightly.	...	...	...	1000	100	3 ozs.	7.00	30.00	110.00	....
*Sulphate of Ammonia	Has approximately the same effect as Nitrate of Soda, but is less harmful. Discourages many types of weeds, and its continued use frequently results in a cleansing and fining of the turf.	Spring to late summer.	25-0-0	The same warning note may be sounded as with Nitrate of Soda. Sulphate, however, is slower to act, and is far safer. Tends to make the soil acid.	...	...	...	500	50	1½ ozs.	5.50	25.00	90.00	80.00
(b) MANURES OF ANIMAL AND VEGETABLE ORIGIN														
In addition to adding plant-foods, many may with safety be used in sufficient quantity to affect markedly the mechanical condition of the soil														
Ashes, Canada Hardwood	Potash is the chief plant-food in Wood Ashes, and it is generally present in sufficient quantity in most soils; for this reason, Wood Ashes are not often needed on golf-courses.	Any time.	0-0-5	An excess will smother or choke the grass.	3000	300	10 ozs.	1500	150	5 ozs.	5.00	12.50	40.00	30.00
*Blood, Dried	Adds nitrogen and a small quantity of phosphoric acid and lime. A splendid dressing for light soils.	Late winter, spring or early summer.	16-0-0	The land will show an acid reaction after repeated dressings; various fungous growths will be encouraged; maggots, worms and other trouble-makers may be introduced.	1000	100	3 ozs.	500	50	1½ ozs.	6.00	27.50	100.00	90.00
Cottonseed Meal	Yields a small quantity of nitrogen, but does so gradually. Its use results in a fine dark green turf. Cottonseed Meal is particularly useful as a dressing for young grass.	Spring, summer or fall.	3½-3-1	An excess may smother or choke the grass. Otherwise, the material is comparatively harmless.	3000	300	10 ozs.	2000	200	6 ozs.	3.25	15.00	57.50	55.00
Cow- or Cattle-Manure, Shredded	Cow-droppings from which excess moisture has been driven off, the process also killing most of the weed seeds. Not often recommended for golf, but when used, 400 pounds may be estimated as the equivalent of a load of fresh Cow-Manure.	Spring, summer, or fall.	2-1½-1	Do not use much in excess of quantities advised; the land may sour.	2000 to 5000	200 to 500	6 ozs. to 16 ozs.	1000 to 2500	100 to 250	3 ozs. to 8 ozs.	4.50	15.00	55.00	45.00
*Sheep-Manure, Purified Pulverized	Sheep-droppings, treated as above. Highly recommended for greens and tees, particularly on soils which either are excessively heavy or excessively light.	Spring or early fall.	2½-1½-1½	Keep within recommended limits. Sheep-Manure in excess is somewhat caustic and burning would result.	2000 to 5000	200 to 500	6 ozs. to 16 ozs.	1000 to 2500	100 to 250	3 ozs. to 8 ozs.	5.00	18.00	55.00	50.00
Spent Mushroom Soil	Stable-manure which has produced a crop of mushrooms, and which is partly rotted. Recommended for tees, greens, and fairways. Splendid for starting a compost heap.	Spring, summer, or fall.	1-1½-1	Difficult to use too much, provided it is mixed well with the soil on which it is being applied. If this is not watched the material would be likely to dry out during hot weather and become unsuitable as medium for grass.	20,000 to 50,000	2000 to 5000	4 lbs. to 10 lbs.	10,000 to 25,000	1000 to 2500	2 lbs. to 5 lbs.	....	....	....	5.00
*Tankage (Blood and Bone)	Has approximately the same effect as Bone Meal, but Tankage is seldom used for golf purposes.	Any time.	6-12-0	Earthworms, grubs, and fungous growths will be encouraged, and a general acid condition of the soil is likely to result from its excessive use.	1000	100	3 ozs.	500	50	1½ ozs.	4.50	20.00	70.00	60.00
Horse-Manure Cow-Manure Farmyard Manure	Is almost a necessity on all construction work, but for putting-greens should be used in a rotted condition. Green committees are urged to procure a supply whenever available and store in compost heaps.	Any time, but use only fresh manure in fall or winter, and then for plowing under.	½-1-½	Difficult to use too much, short of changing entirely the character of the soil. Do not smother grass with too much rotted compost.	30,000 to 60,000	3000 to 6000	6 lbs. to 12 lbs.	15,000 to 30,000	1500 to 3000	3 lbs. to 6 lbs.	These materials are sometimes obtainable locally, with more or less difficulty. On request, we are always glad to quote prices. (Carload lots only.)			
*Chicken- *Pig- *Goat- *Sheep- *Pigeon- Manure	Should never be used except when at least a year old, and then preferably composted with other materials.	Any time, when properly cured	Composition various	Remarkably easy to use too freely. These materials are high in plant foods, caustic, and may burn or stain the grass.	750	75	2½ ozs.	500	50	1½ ozs.	Obtainable locally in limited supply.			
(c) MECHANICAL MATERIALS														
Most of them furnish little or no plant-food, but are valuable for (1) changing the texture of the soil, and (2) for mixing with, and helping the distribution of other more potent fertilizers. In other words, generally are of great value in compost														
Charcoal	When mixed with soil, Charcoal tends to lighten it; it helps to dry out wet land and to sweeten sour soils. As a top-dressing, it frequently has the effect of producing a fine sod where only coarse grass previously existed.	Any time.	Composition various	None of these materials will support grass alone, and their use in excess of the quantity indicated in the adjoining columns would be likely to produce a sterile condition. Of particular value for mixing with Nitrate of Soda, Sulphate of Ammonia, and other concentrated materials which would be likely to damage turf unless means are taken to insure their even distribution. Those chemicals which need blending in this way are marked thus (*) in this table.	4000	400	12 ozs.	2000	200	6 ozs.	5.00	22.50	75.00	65.00
Humus	May be used profitably on sands, sandy loams, or even on heavy land if it is deficient in vegetable matter. Highly valuable, and cost alone limits its use.	Any time.	Composition various	30,000 to 60,000	3000 to 6000	6 lbs. to 12 lbs.	15,000 to 30,000	1500 to 3000	3 lbs. to 6 lbs.	3.50	15.00 F.O.B. New York	20.00 F.O.B. Shipping Point	8.00 (Not in bags)	
Sand	Excellent as a top-dressing at all times, especially as a protection over winter. Frequently has the effect of fining the turf. Assists surface drainage. Sand should be "sharp," that is, its grains should be about the size of the letter "O."	Any time.	Composition various	6000 to 12,000	12 lbs. to 24 lbs.	30,000 to 60,000	3000 to 6000	6 lbs. to 12 lbs.	....				
Top-Soil	A practical necessity for the production of permanent grass. If grading is necessary during the construction of a fairway, care must be taken always to preserve and return the surface 6 inches. In the building of putting-greens or tees, a layer at least 6 inches thick should be applied, consisting of top-soil and such other materials as appear necessary.	Any time.	Composition various	Weed seeds must be expected with top-soil, even when it is obtained with the greatest care from the cleanest spots. Arrange to spread out the material for as long a period as possible before using or before sowing with grass seeds; this will give the seed an opportunity to grow, when they may be killed by hoeing.	....			On new putting-greens, use from 20 to 50 loads of top-soil per green (the latter figure is not excessive). Mix with Mushroom Soil, Humus, Peat-Moss, or Sand, as may be necessary to render it mechanically fit to carry a turf; also with Emerald Grass Fertilizer, Bone Meal, or similar grass-foods. As a medium for top-dressing, 20 loads per acre, or 2 loads per green, would be usual.						
Peat-Moss	A vegetable product that requires many years before it will decay in the soil. In the meanwhile, it will absorb moisture and give it up slowly to the grass plants. Further, its presence in the top layer of the soil of a putting-green adds materially to the resilient, carpet-like feel of good turf.	Any time.	Composition various	Do not use in very much greater quantities than those suggested. The remarks under Charcoal, Humus and Sand apply also to Peat-Moss.	....	1000	2 lbs.	....	500	1 lb.	Per bale of approximately 200 lbs. \$5.50.			

Wherein Is the Difference In Seeds?

ALL seeds look alike. However, not only may some not grow very well, but in the subsequent results *there is considerable variation*. Some will not produce the results you want, others will, while others again produce crops as near perfection as is humanly possible. Seedsmen aim to supply the latter, but seedsmen differ in their efforts and in the care they exercise. How does a seedsmen endeavor to supply the best? By paying a premium to the farmer grower, by testing again and again for vitality, by growing under garden and farm conditions the seeds that he sells. The Stumpp & Walter Co. believe that they have a very high conception of the importance of these factors, and they maintain an expert staff to watch the interest of their clients. Such efforts are costly, and that is why some seeds cost higher than others. The difference is between the cost of "seeds plus uncertainty" and seeds from which as much of the uncertainty as possible has been removed.

"*AND he gave it for his opinion,
that whoever could make two ears
of corn, or two blades of grass, to grow
upon a spot of ground where only one
grew before, would deserve better of
mankind, and do more essential service
to his country than the whole race of
philosophers put together."*

—JONATHAN SWIFT.

Stumpf & Walter Company's Ready Reference Formulae for Greenkeepers

FERTILIZERS AND MANURES

MATERIAL	WHY IT IS USED	WHEN IT IS USED	TYPICAL ANALYSES (Subject to variation) Ammonia, phosphoric acid, potash	WHAT MAY HAPPEN IF TOO MUCH IS USED	HOW MUCH MAY BE USED						PRICE (Subject to change without notice)			
					When preparing new land for grass			For top-dressing existing turf			100 lbs. F.O.B. New York	500 lbs. F.O.B. New York	2000 lbs. (Ton) F.O.B. New York	Per ton (2000 lbs.) In carload lots F.O.B. shipping point
Lbs.	Putting-Green (Average) Lbs.	Square Yard	Lbs.	Putting-Green (Average) Lbs.	Square Yard									
(a) CHEMICAL FERTILIZERS														
These add to the land the plant-foods required by grasses, but they have little effect upon the mechanical condition of the soil														
*Bone Meal	Adds nitrogen, phosphoric acid, and lime to the soil. Is slow-acting and lasting; a splendid grass-food, but has the reputation of encouraging into growth any seeds of White Clover that may be in the land.	Any time.	3-24-0	The soil may become sour; grubs, earthworms, and other forms of life encouraged, and fungous growths developed.	1500	150	5 ozs.	750	75	2½ ozs.	\$4.50	\$17.50	\$60.00	\$50.00
Basic Slag (Thomas' Phosphate Slag)	Contributes phosphoric acid and lime. Is slow-acting.	Fall and winter.	0-16-0	Safe to use, but if applied too freely tends to encourage clover.	2000	200	6 ozs.	1000	100	3 ozs.	Price on application.			
Stumpf & Walter Co.'s Fairgreen Fertilizer	Adds to the soil the element required by grass. Although quick to act, its effect is spread over one or two years.	Spring, summer, or early fall.	0-15-0	An excess may burn the grass temporarily, but quite safe when used in the quantities indicated.	1500	....	5 ozs.	750	....	2½ ozs.	4.50	15.00	50.00	45.00
Stumpf & Walter Co.'s Fertilizing Meal. (For top-dressing)	Nurses along grass that has been newly sown; nourishes and protects it during the most critical period of its existence.	Spring, summer, or early fall.	6-3-½	Cannot harm the young grass unless applied greatly in excess of the proportions suggested.	....	....	....	2000	200	6 ozs.	6.25	27.50	90.00	80.00
*Stumpf & Walter Co.'s Emerald Grass Fertilizer. (For Putting-greens)	A well-balanced formula, designed to feed only the finer grasses, and to keep them in a fine, healthy condition.	Spring, summer, or early fall.	4-6-0	Used with ordinary care, it will not damage existing grass in any way. We advise always that it be mixed with twice its bulk of top-soil, sand or humus.	1500	150	5 ozs.	750	75	2½ ozs.	5.50	20.00	70.00	60.00
*Stumpf & Walter Co.'s Anti-Clover Manure	Supplies food to the grass plants only; these are encouraged and they flourish, while clover is eventually crowded out. Frequent dressings are advised.	Spring, summer, or early fall.	6½-12-0	The above remarks apply. Should the upper leaves of the grass plants be scorched through using quantities in excess of those suggested, the turf will quickly recover; no permanent damage is likely.	1500	150	5 ozs.	750	75	2½ ozs.	6.00	25.00	80.00	70.00

FUNGICIDES, INSECTICIDES AND SUNDRY CHEMICALS

Ammoniated Copper Solution. An excellent preventive of the Brown-Spot Fungus in putting-greens. Spray weekly if an attack is feared. Mix one gallon of the solution with 40 gallons of water. Gal. \$4.

Arsenate of Lead. Powder. Recommended occasionally for cutworms. Lb. 65 cts., 5 lbs. \$3, 10 lbs. \$5, 50 lbs. \$22, 100 lbs. \$41.

Bichloride of Mercury (Corrosive Sublimate). A deadly poison. Occasionally recommended for killing earthworms. Keep it under lock and key when not in use. "Vermol" is safe and more effective. See page 25. Lb. \$2.

Black-Leaf 40. A concentrated solution of nicotine sulphate; an excellent spray for lice which appear on shrubbery. Dilutes one part to 900 or 1,000 parts of water, according to treatment. Full directions on each package. 1-oz. bottle 35 cts., ½-lb. tin \$1.25, 2 lbs. \$3.50, 10 lbs. \$13.50.

Bordo-Lead, Paste. For trees and sundry plants around the course. Arsenate of lead combined with a special bordeaux mixture by a new process, producing in one spraying operation the killing of insects and preventing of blight, mildew, rust, etc. Splendid for potatoes and most vegetables, apples, pears, and roses. Sticks like paint and remains on foliage. Best crop insurance. Lb. 40 cts., 5 lbs. \$1.75, 10 lbs. \$3, 25 lbs. \$6, 50 lbs. \$11.50, 100 lbs. \$21.

Bordeaux Mixture. The standard fungicide. Spray frequently as a preventive of fungus in turf. Powder form: Lb. 30 cts., 5 lbs. \$1, 10 lbs. \$1.75. Paste: Lb. 35 cts., 5 lbs. \$1.50, 10 lbs. \$2.75, 50 lbs. \$10, 100 lbs. \$18.50.

Carbon Disulphide. Gives off a gas which is fatal to ants, grubs, and earthworms. Although a poison and highly inflammable, is safe if reasonable care is used. Will kill grass, hence must be introduced into the soil through a special funnel as shown on page 30. Lb. 75 cts.

Climax Lawn Sand. This is by far the best preparation for eradicating weeds from existing turf. It will not destroy established perennials such as Dandelions, Plantains or Crab Grass, but it will kill young Dandelions, young Plantains, together with those annual weeds which have a fibrous root system, such as Chickweed, Mouse Ear, Veronica, also Moss. Further, it feeds the grass, and we recommend its extended use. For areas heavily infested with weeds, we advise that the Lawn Sand be scattered over the turf at the rate of four ounces per square yard, while for individual weeds, a small quantity, say a spoonful, placed on the crown of each weed will very quickly destroy it, and will stimulate the surrounding grass, so that the patch left by the weed very quickly heals. 3½ lb. can 65 cts., 7-lb. can \$1.25, 14-lb. can \$2, 28-lb. pkg. \$3.75, 56-lb. pkg. \$7.25, 140-lb. \$14.

Cyanide of Soda. Another highly dangerous poison, but necessary for killing the white grub. Lb. \$1.

Formaldehyde. An effective and widely known fungicide and germicide of occasional value for golf. Fluid pound (pint) 50 cts., 60-lb. keg \$18.

Herbicide. For destroying weeds in roadways, paths and gutters. Fatal to grass and other plants, including weeds, but does not injure stone, woodwork or the shoes of the person applying it. One gallon of Herbicide mixed with forty gallons of water is sufficient for 100 to 150 square yards of roadway. Qt. 60 cts., ½-gal. \$1, gal. \$1.75, 5-gal. keg \$7.50, 10-gal. keg \$13.50, 30-gal. cask \$30, 50-gal. bbl. \$45.

Kerosene Emulsion. Occasionally recommended as a spray for putting-greens infested with white grub. Contains 55 per cent kerosene. Dilutes 1 part to 25 to 50 parts of water. Qt. 60 cts., gal. \$1.50, 5 gals. \$6.25.

Lime-Sulphur, Concentrated. For spraying trees to destroy San José scale. One gallon makes ten gallons of spray; dilute with cold water. Qt. 50 cts., 1-gal. can \$1, 5-gal. can \$3.25, half-barrel (about 25 gals.) \$8, barrel (50 gals.) \$13.50.

Paris Green. A well-known poison occasionally demanded when a green is infested with cutworms. Mix 5 pounds with 50 pounds of moistened bran and scatter on the green after play is over for the day. Brush up and remove next morning. Lb. 75 cts., 5 lbs. \$3.25, 14 lbs. \$7.50.

Powdered Sulphur. Twenty-five pounds per green of this, dusted over the turf is frequently effective in warding off an attack of fungus. Lb. 25 cts., 5 lbs. \$1, 10 lbs. \$1.60, 100 lbs. \$12.

Sulphuric Acid. Commercial strength. Occasionally used as a weed-killer. Extreme care in using this material is necessary. Fluid pound (pint) 75 cts.

Tobacco Stems. Sometimes used by greenkeepers as a dressing for putting-greens. Bale of 100 lbs. \$4.

INSPECTION OF GOLF COURSES

A part of our service is to make personal inspections of golf courses and advise with you on the ground. Usually we can arrange to do this without cost to you—we suggest that you write us.

Wherein Is the Difference In Seeds?



ALL seeds look alike. However, not only may some not grow very well, but in the subsequent results *there is considerable variation*. Some will not produce the results you want, others will, while others again produce crops as near perfection as is humanly possible. Seedsmen aim to supply the latter, but seedsmen differ in their efforts and in the care they exercise. How does a seedsman endeavor to supply the best? By paying a premium to the farmer grower, by testing again and again for vitality, by growing under garden and farm conditions the seeds that he sells. The Stumpp & Walter Co. believe that they have a very high conception of the importance of these factors, and they maintain an expert staff to watch the interest of their clients. Such efforts are costly, and that is why some seeds cost higher than others. The difference is between the cost of "seeds plus uncertainty" and seeds from which as much of the uncertainty as possible has been removed.

Stumpp & Walter Co.

3211
3212
3260 CORTLANDT
1231

SEED AND BULB GROWERS AND IMPORTERS

GEORGE G. STUMPP, PRESIDENT.
JULIAN H. WALTER, TREASURER
WILLIAM A. SPERLING, SECRETARY

30-32 BARCLAY STREET,
New York

CABLE ADDRESS
"STUMPWALL"
A.B.C. CODE 5TH EDITION
IMPROVED (MEJORADA)

NOTE.—WE, STUMPP & WALTER CO., GIVE NO WARRANTY, EXPRESS OR IMPLIED, AS TO DESCRIPTION, QUALITY, PRODUCTIVENESS OR ANY OTHER MATTER OF ANY SEEDS, BULBS OR PLANTS WE SEND OUT, AND WILL NOT BE RESPONSIBLE FOR THE CROP.

To The Reader

We invite your criticisms of "Golf Turf" and we would appreciate all suggestions you can offer towards making future editions of increased service to our golfing friends.

If "Golf Turf" interests you it will interest your associates. May we ask you to favor us with the addresses of your friends to whom you would like us to mail a copy? Please enter in the space below.

Use reverse side for additional names.

Extreme Purity Necessary in Seeds for Golf



CLUB annually spends a large sum for the purpose of removing weeds from greens, tees, and, in some cases, fairways. The seeds from which these weeds spring may be already in the soil, and they further may be washed onto the green, blown onto the green, and deposited there by birds or other agencies. It is obviously unwise to add to these weeds, which ordinarily find their way onto a golf course, by sowing more weed seeds—in other words, by sowing seeds which could, by dint of a little more care and trouble, be made freer of weed seeds. No golf club need ever sow any seeds which have not been cleaned and recleaned to the highest point of perfection. Such seeds cost a few cents per pound more than commercial stocks, but such a slight extra charge is offset again and again by the saving in the club's labor bill for weeding. Further, you will invariably get *more seeds of the kind you want* in a pound of seed that has been thoroughly recleaned than you will from seeds that have not been so thoroughly purified, because along with the weed seeds, empty husks and other materials are withdrawn by the cleaning. Very often the highest-priced seed is really cheaper (by actual count of seeds) than the lower-priced seed.

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